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SCIENCE FICTION AND FACT

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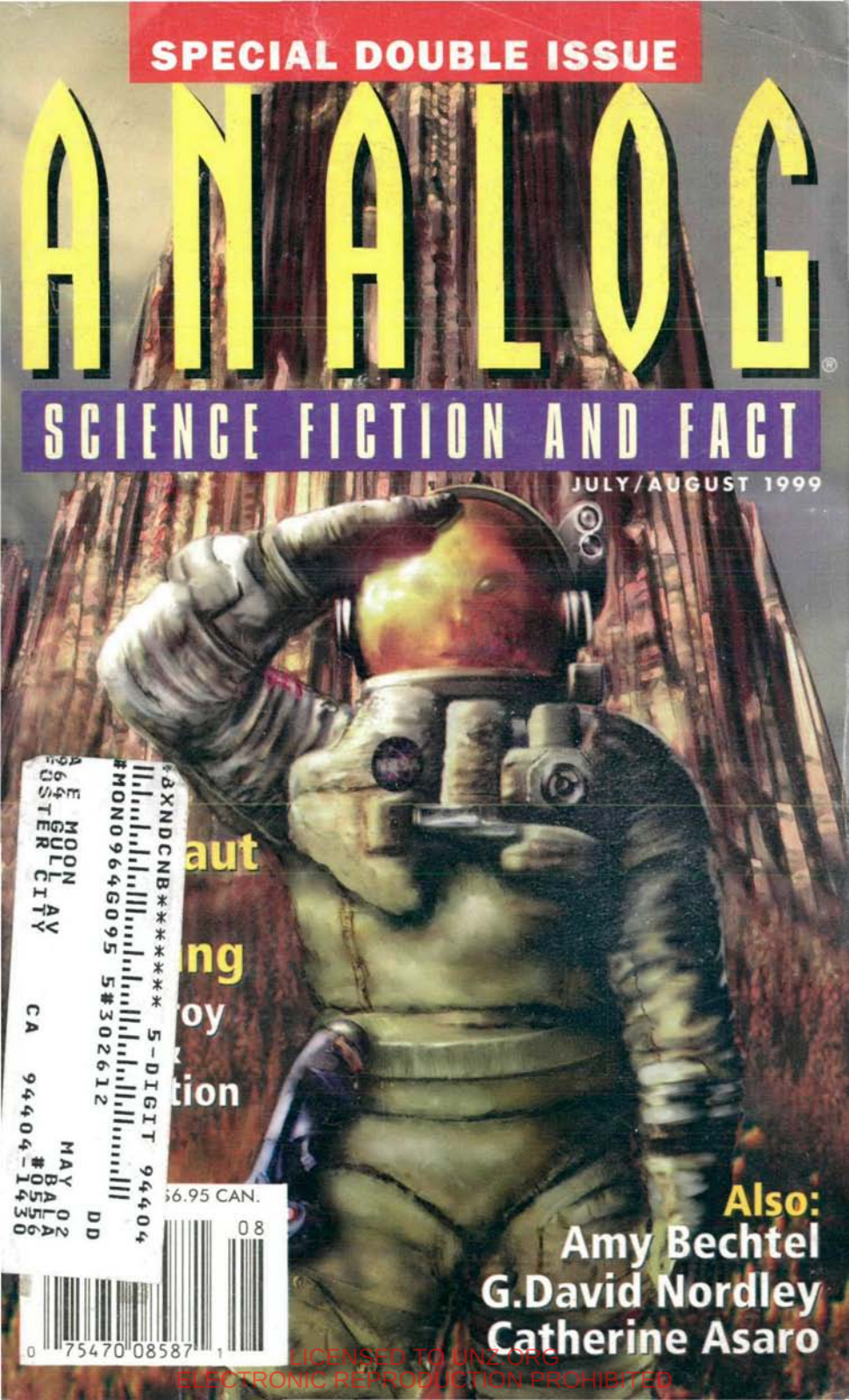

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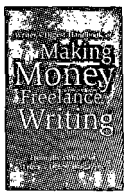

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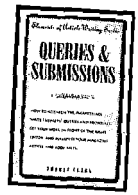

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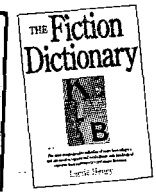

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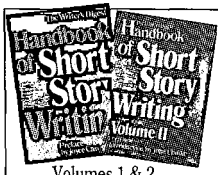

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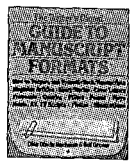

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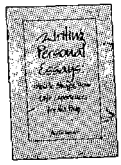

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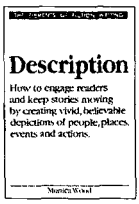
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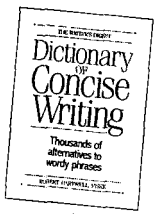

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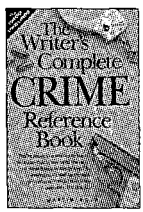

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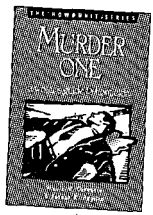

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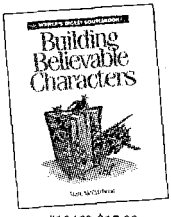

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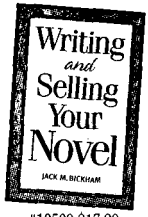

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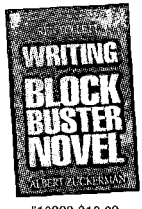

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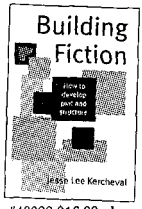

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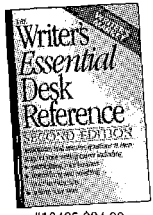

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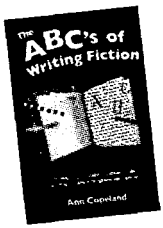

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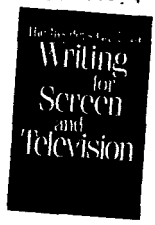

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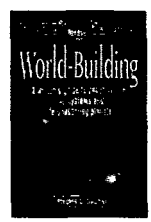

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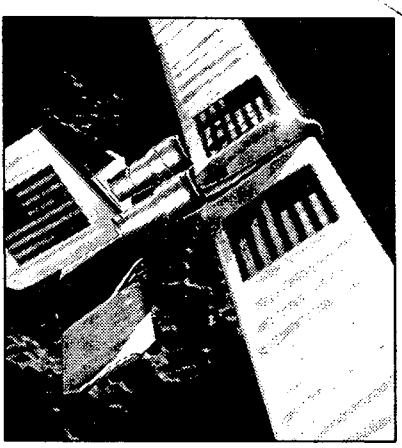

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EDITORIAL Stanley Schmidt

POLITICAL CORRECTION

It's now been several years since we started hearing about "political correctness." I had hoped that by now it would have gone away, but unfortunately it still keeps stirring here and there. So I guess it's time to take another whack at it.

Actually the term seems to be used in at least two fairly distinct ways—to describe certain ways of controlling the words and deeds of oneself or others, or to condemn someone else by accusing them of those ways—but the one fundamental fact that hardly anybody ever seems to mention is this. "Political correctness" is an inherently nonsensical phrase. It is an oxymoron, a combination of two words in which one appears to modify the other even though their meanings are mutually contradictory and incompatible.

"Correct," at least in a scientific sense, means in accordance with truth. And that is not and cannot be determined by political means.

I'll grant that "correct" has a long history of other uses, including "conforming to some specified convention or standard." I'll even grant that such standards can be matters of shifting political climate or fashion. The danger—and it *is* a danger, literally—arises when people confuse the two uses of "correct."

Things may indeed be politically correct (or incorrect) if by that you mean only that they conform (or fail to) to some politically established convention. But that is *never* equivalent to their being true or false in any objective sense.

For example, a recent issue of *Scientific American* introduced a series of articles on recent developments in cosmology by telling of a vote taken at a conference on whether the participants believed some observations that were inconsistent with currently prevalent theories. This vote was *not* (as the cosmologists well knew but some laymen might not) to determine whether the observations were accurate. It was just an appraisal of the current state of *thinking* in a rapidly changing field. It told how many astronomers accepted the observations, and nothing more—and most especially, it said nothing about whether the data were true. The correctness (i.e., accuracy) of scientific theories or observations can *never* be determined by a vote, even of "experts." It is determined entirely by how well they describe what the universe is actually doing.

Plate tectonics was no more wrong in the past because a majority of geologists didn't believe in it, than it is right now because a majority do. Correctness is independent of popularity.

An *Analog* reader once objected to theories about human evolution that L. Sprague de Camp described in an article, calling them "obnoxious views." She thought we shouldn't have published them for that reason. I have no doubt that she found them obnoxious, but that has absolutely nothing to do with their truth, and is not a reason for rejecting them if they are true.

I think I first heard the phrase "politically correct" used to describe a fad for defining certain topics and expressions as Not to Be Used, and perhaps specifying other words (which in a more honest age would have been called euphemisms) to be used in their stead. It was politically correct to call a blind person "visually impaired," but not "blind,"

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because that might be found offensive. Such things were *politically* correct because the motivation was often to avoid offending anybody who might vote for or otherwise support you. But the fad soon spread well beyond that kind of motivation for politicians, to such ridiculous extremes as "liberal" colleges banning the use of certain words in student publications, and publishers dictating what percentage of the characters in novels had to be of what ethnicity. This led to the irony of institutions that had long championed freedom of speech turning around and imposing their own kind of censorship. Fad had become Policy—and that way lies danger.

Which led quite naturally to the *other* use of the term: to condemn people one didn't agree with by accusing them of that kind of censorship, whether they were actually doing it or not. Or as author Rick Cook put it in a February 1995 letter to the editor of *Analog*, "The other problem with PoCo-ness is that—like McCarthyism—it provides a convenient rock for social cockroaches to hide under. If you were a genuine Stalinist in the '50s and '60s you could garner a fair amount of sympathy and a good deal of uncritical support by claiming to be the victim of a McCarthyist smear. Likewise the real bigots among us can claim that any expression of disapproval is an example of 'political correctness' and, like the Stalinist or McCarthyist, get some sympathy from people who are fed up with the whole business."

I must confess I was a bit slow to pick up on this usage, because in the early days of "PoCo" I was much more aware of people making a valid complaint against an insidious and scary phenomenon. When a reader remarked that in his experience "politically correct" seemed to be a general term of condemnation applied to any person or position one didn't like, I was skeptical because that didn't match my experience. But as time went on, I saw more and more examples of what he was talking about; and with hindsight, I suppose that this secondary usage was inevitable.

I saw a fairly recent example in the form of a letter from a reader who was cancelling his subscription because he read one story as "blatant anti-religious propaganda" (which it wasn't). He went on to complain that this was just the latest example of our alleged descent into "political correctness," and to decry the dangers of "self-censorship" dictated by same.

All of which was ironic on several levels. For one, if he was really reading the magazine regularly enough to notice "trends," he should have noticed that both I and several of our authors have taken frequent potshots at the whole concept of "political correctness." For another, in almost the same breath he was decrying "self-censorship" and attacking us for not *practicing* self-censorship to exclude a view *he* didn't like from our pages.

In addition to making the classic error of reading things into a story that the author didn't put there, he evidently thought that our printing something he

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didn't like meant that a desire for Political Correctness was driving us to "self-censor" against publishing ones that he *would* like. Which is ironic in yet another way because a counterexample was immediately at hand in the same issue he complained about: the very next story after the one that he considered "anti-religious propaganda" showed a religious institution in a very favorable light!

This reader evidently missed the point that *Analog* has always tried to explore a wide range of viewpoints. The only explanation I can see for his accusation of "political correctness" is that, in practice, the range of views people are willing to consider now is wider than before. There used to be a lot more unspoken self-censorship than there is now. More things were "not talked about in polite society"—and some of that attitude inevitably spilled over even into editorial choices in this magazine.

In addition, many writers (like many people in the society at large) have become convinced that there *were* some past imbalances in such areas as casting, and resolved not to perpetuate them. The fact that a view is popular, or even "politically correct," doesn't automatically mean that it's wrong, any more than it means that it's right. There's a big difference between a publisher *demanding* that its authors write about more female or black or handicapped characters, and a lot of writers independently deciding they want to.

So (somewhat wearily) let's say it quite explicitly yet again: *Analog* has absolutely no interest in "political correctness" and will ignore any efforts to force it to follow such dictates. But it has a lot of interest in exploring a wide range of characters, ideas, and opinions. Basically, our only criteria are that the stories be entertaining and that any viewpoints expressed be presented cogently enough either to convince or to stimulate intelligent rebuttal. (We *do* discriminate against incoherent, illogical rants.)

So we will continue to publish a wide range of stories that we hope will stimulate both thought and emotion—that will generate both light and heat. By its very nature, that mission implies that it's unlikely that any reader will agree with *everything* we publish. (*I* don't agree with everything we publish!) This implies that we will also continue to get the occasional complaint of the type I've described. But most of our readers, I think, enjoy having their minds stretched, even if it sometimes means having to think hard about a view that makes them uncomfortable.■

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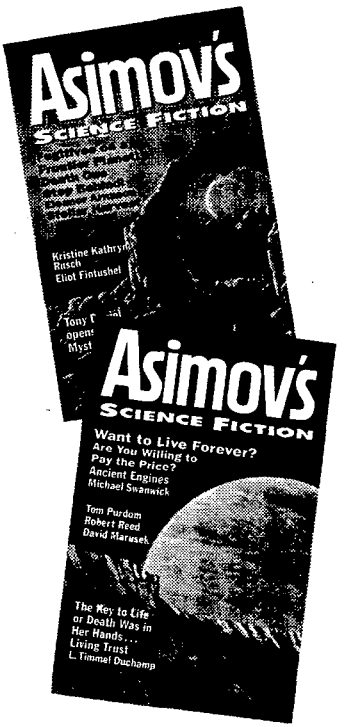

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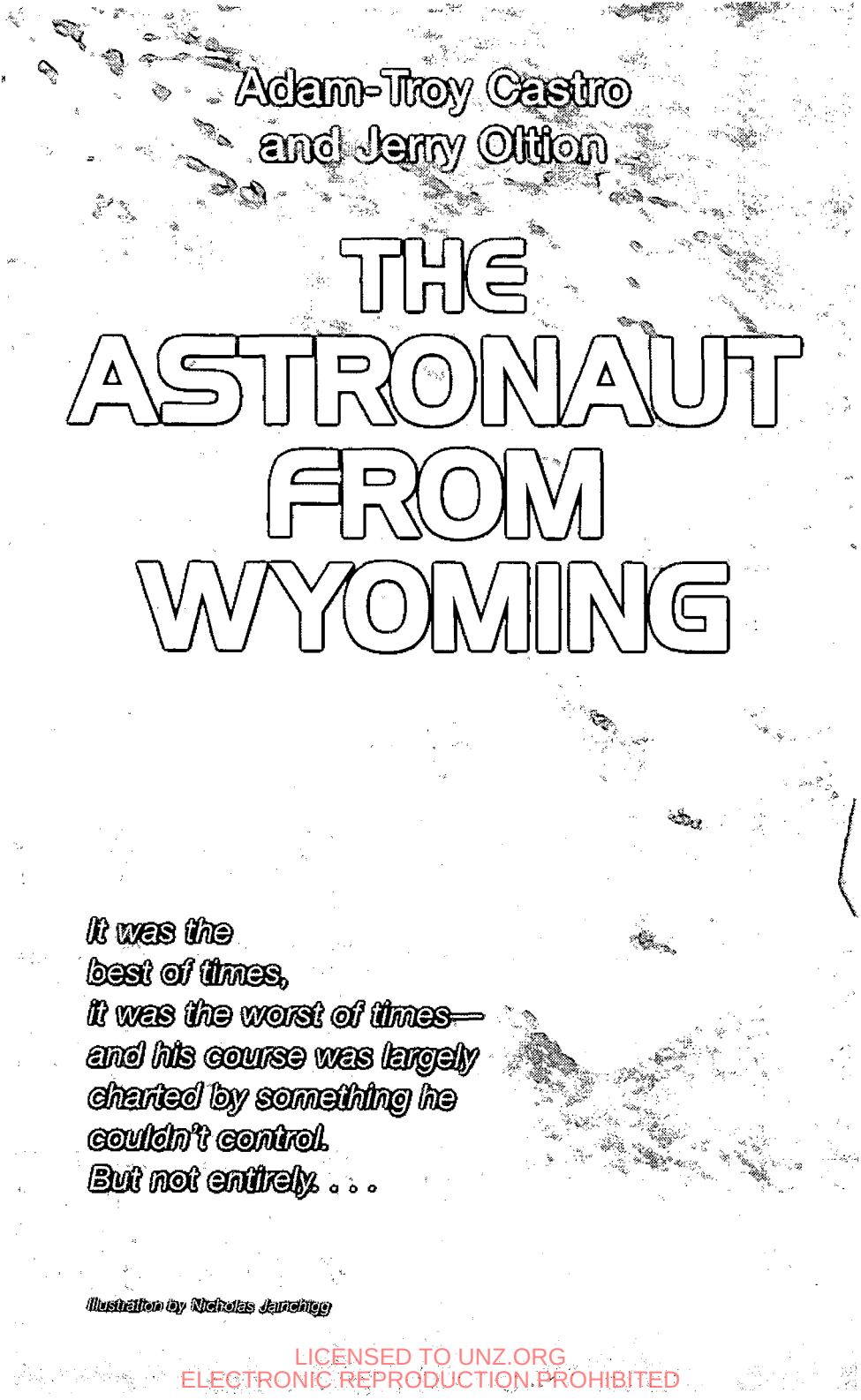
Adam-Troy Castro
and Jerry Oltion

THE ASTRONAUT FROM WYOMING

It was the best of times, it was the worst of times—and his course was largely charted by something he couldn't control. But not entirely. . . .



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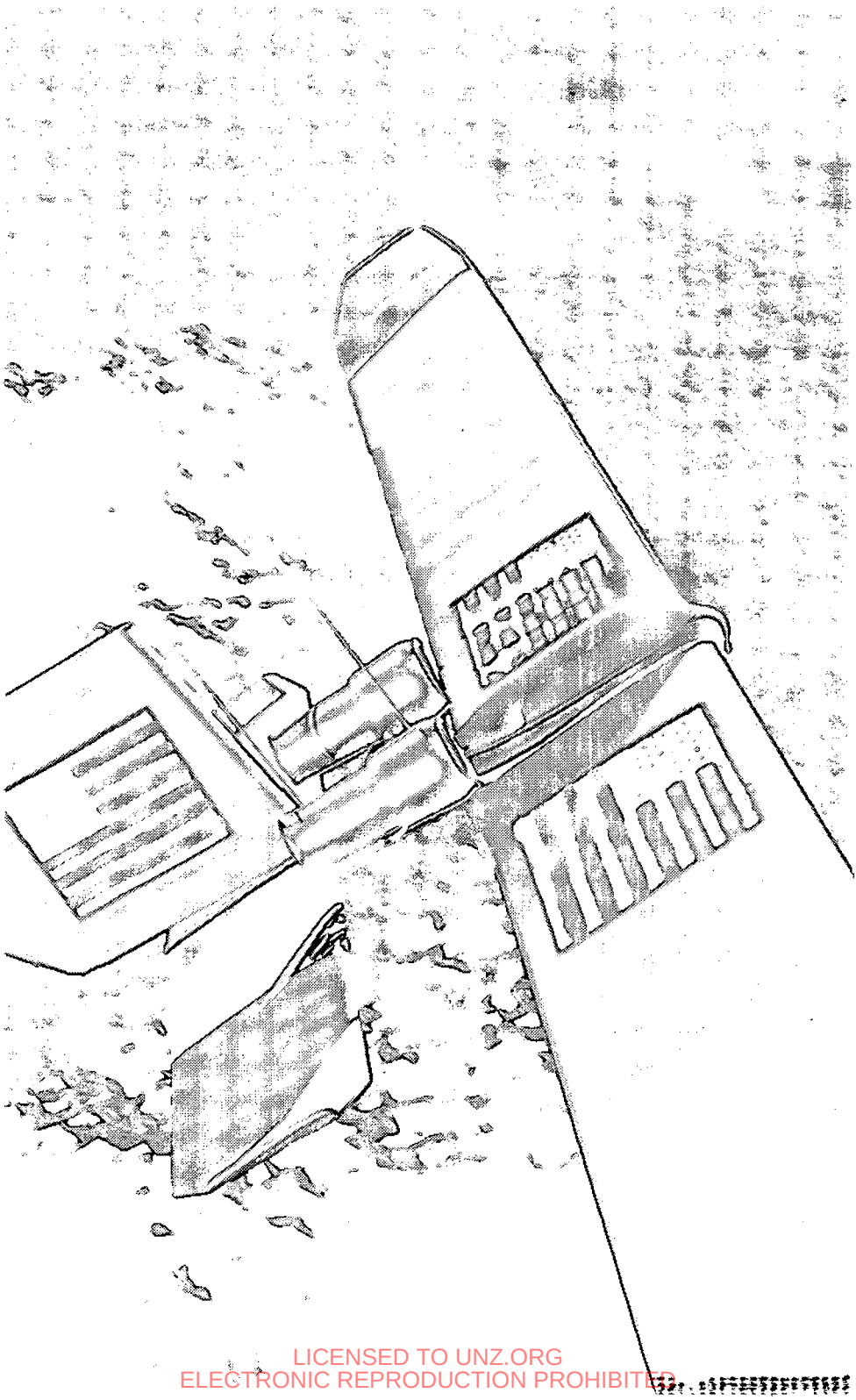

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To understand Alexander, you must first understand his time.

It was an age when the universe had been opened for us. We knew how to look at objects a thousand light years away, and map the molecules that gave them form; we knew how things were put together and how they could be taken apart; we knew how the universe began and how it was likely to end. We knew how to reason, and how to discover, and how to add new pages to our increasing store of information.

It was also an age when ignorance was enshrined over knowledge. Every local newspaper contained a horoscope. World leaders consulted astrologers; psychic hotlines made millions; and a United States Senator gained ten points in the polls by claiming to have been in contact with Ancient Aztecs. We knew what comets were, where they came from, and what they didn't foretell . . . but in a compound in San Diego, thirty-seven intelligent, college-educated people took poison because they believed that a comet called Hale-Bopp would take them to heaven if they did.

In Alexander's age, we had knowledge . . . and we had delusion. And we preferred the delusion.

You cannot understand Alexander Drier's life without understanding that.

You cannot understand his final gesture without understanding that.

Of course, Alexander's time is still our time. Which is why some of you are most interested in reading about a high-ranking government coverup of alien experiments on pregnant human women.

I can't help what you want. I knew that going in.

But that's not what happened.

SPACE BABY SPEAKS
FIRST WORDS AT BIRTH!
Warns of Threat From Space,
Parents Say

The first tabloid reporter arrived in town one day after the birth, the first delegation from the networks right behind him. Not long after it hit the web, the pilgrims showed up. They came in motor homes, in vans, on motorcycles, and on foot: the four-man Sweethaven Sheriff's Office had to import a couple of dozen state police just to keep the kooks and the loonies and the just plain curious at bay. Most just wanted a glimpse of the child. A few—thankfully, very few—had darker things in mind; gene-splicing their mythologies, they arrived with rifles and pamphlets and hate-filled eyes, muttering black fantasies about an Antichrist seeded from the nonexistent Dark Side of the Moon.

I didn't get to meet him until his tenth birthday, but I can only imagine how frightening a time it must have been: Alexander's parents and the rest of the immediate family barricading themselves behind drawn curtains, looking out upon the steadily increasing madness of a crowd that seemed to represent all the rest of the world.

Alexander's mother, Faye, was so serene about the whole thing that she seemed to be in denial. She just held the baby and sang to him, making almost no reference to the mad scene just beyond the driveway.

"It's funny," she said at one point. "We don't know him, really. We don't know whether he'll be good or bad, smart or dumb, brave or afraid . . . the kind of things he'll be interested in or the kind of things that'll bore him silly. He's a stranger to us. An alien, for real."

Mark Drier winced as he glanced at the window. The blinds were drawn, but he could still see the crowds, growing larger every hour; some of them chanting, some of them singing, some of them shouting in rage. "Better not let them hear you say that."

Many years later, telling me the story, Alexander's Uncle George shook his head with awe as he remembered what Faye said at that moment: "Them? Who cares about them? They'll go away."

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She was right, of course; the crowds began to diminish as soon as even the dimmest pilgrims began to realize that they weren't about to get beamed aboard any orbital crockery. And the tabloids went after fresher stories the first time a Sheen misbehaved in Hollywood. But her prophecy couldn't have seemed likely to Mark Drier that morning . . . not with the house being monitored by ten TV networks, the phone unplugged to keep it from ringing off the hook, and Grandma having a quiet mental breakdown in the bedroom upstairs. At the moment, he knew only that nothing would ever be all right again.

Alexander wasn't deformed, at least, not in the sense that I'm deformed. He had two of everything he needed two of and one of everything he needed one of. And it was all functional. It all worked. He was even beautiful, in the sense that all healthy babies are beautiful. But his head was unusually large: it mushroomed above the temples, bulging up and out like a sack stuffed with more than it was designed to hold. (The doctors had feared water on the brain, but it just happened to be the shape of the kid's head; the only problem it caused was in delivery, and that had been handled by the caesarian.) His eyes were about three times larger, proportionally, than the norm for a baby of that size; and they were all black, with no whites showing at all. His nose, as if to compensate, was unusually small, little more than a nostrilled wrinkle in the center of his face. His mouth was a slit with thin, pursed lips. His ears were little round buds with holes. His hands were odd too: there were five fingers and a thumb on each, with the fingers all disproportionately long.

Still, that, by itself, wasn't the problem. At least, not as Mark Drier saw it. He was not a weak man. He could have dealt with birth defects.

The problem was that everybody in America had already seen that face. They'd seen it staring at them from movie posters, from bestselling books, from artist's renditions on the covers of supermarket tabloids. It was a face so frequently depicted in the mass media that even people who refused to subscribe recognized it as a well-known inhabitant of our shared popular culture: the face described by the growing subculture of folks who claimed to have been abducted and experimented upon—usually in the form of anal probes—by creatures from outer space.

It was, in short, the face of a Roswell Alien.

Mark Drier peered out through the curtains again. The view out there was just as disturbing. Even as he watched, a flyspecked yellow schoolbus crammed with doughy, pasty-faced adults pulled up at the curb. An inordinate number of the faces at the windows had open mouths. He couldn't quite tell whether they were shouting, or just chronic mouth-breathers. Their expressions were both ecstatic and dull: like sheep having a party. He shuddered. "I don't know, Faye. That's a mob. We may have to start planning escape routes, in case they rush us."

"They won't," Faye said placidly.

"They'll do what they want," Mark said. "Don't you see? Some of them came all the way across the country! They're not going to let a front yard and a few closed doors stop them now!"

She considered that. "Then we'll just have to go outside and tell them they're disturbing the baby."

"And what makes you think they'll listen to that?"

"If they think he's a space baby, capable of shooting deathrays from his fingers, they just might. But I don't think it'll be a problem. They'll get tired. They'll feel silly. They'll go home. And they'll leave us to the business of being a family." She smiled, and touched noses with the baby. "It'll work out. He's beautiful."

Nobody said anything to that.

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Then Faye looked at them, and in a voice filled with soft sweet steel, a voice that damned them for not responding, repeated, "He's beautiful."

The gathered Uncles and Aunts hastened to assure Faye that they agreed. Mark joined in last—reluctantly, and unpersuasively, and with what must have been shame for not being able to feel it the way she did.

SPACE BABY FORETOLD IN BIBLE!
Will He Start World War Three?

I'm going to have to take a break to ward off the expectations of an unfortunately large percentage of the people reading this account of Alexander's life.

Alexander was not an alien. He was not a half-human, half-alien. He was not the result of genetic manipulation by aliens who wanted an emissary on Earth. He was not the spawn of a UFO abduction his mother repressed. He learned to speak at about the same rate all children do. And he wasn't the harbinger of a message from space, though come to think of it that eventually turned out to be a little closer to the truth. He was a boy: one who may have been a little different from the rest of us, but one whose genetic birthright, however bent, was still entirely *Homo sapiens*. He came out the way he did because of an extremely rare, but identifiable and very well-documented genetic condition that affected his fetal development, subtly distorting his body in ways that mirrored the by-then well-established folklore of the UFO conspiracy buffs. A search of medical literature was able to find six other cases within the past three centuries: even photos of one poor boy from the early 1900s who spent most of his short life in a freak show in South America. Of course, in today's media-conscious age, there was no way that the malady in question would continue to go unnamed, and so Alexander got the honor of being immortalized in the medical textbooks before he was even old enough to recognize his mother's face. Drier's Syndrome, they called it: and if there was any upside to the public's insistence on believing that the child was somehow a visitor from outer space, it was the degree to which that rescued him from a lifetime of being known as the kid with the disfiguring disease.

But he was human, all right. Gloriously human. There will not, at any point in this narrative, be a surprise revelation that he was ever, wholly or in part, anything but.

So those of you who followed the various events of Alexander's life in the kind of newspapers that run front-page headlines about miraculous chocolate diets, can go indulge your little fantasies elsewhere. Because that's not what happened.

SPACE BABY TURNS TOYS INTO GOLD!
Parents Now Wealthy, Friends Say

Alexander occupied such an important part of my life that I find it hard to feel anything but contempt for anybody who had trouble loving him. I suppose that's the main reason I've always been so hard on his father: why I still automatically think of him as a cold and distant man, unable to forgive his son for being less than normal. I'm also aware that it's the way some biographers have portrayed him—some of them, God help me, even using interviews with me as a primary source.

But it wasn't like that. In the lonely, hysterical days immediately following Alexander's birth, Mark Drier was a frightened man, desperately searching for the plan that would render everything all right—and who can't be hated for coming up with the wrong idea when nobody, with the possible exception of Alexander's mother, knew what the right idea was.

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He found her in the upstairs den, which was the brightest room in the house: a perfect place for a young mother to breastfeed her baby. The baby was, like all babies, trusting, hungry, squirming, and needful. I'd like to think that as Mark looked at his child that day, he felt not instinctive revulsion, but also the awe fit for all new life abroad in the world. He may even have felt the joy of fatherhood. But he was a practical man, and love must always make room for practicality . . . especially with buses of UFO-Abduction Faithful still converging on town from every direction.

Again: I wasn't there. I can't re-create the conversation precisely. But I know the people. And it happened something like this:

Mark said, "We're going to need money."

Faye smiled. "Well, we knew that going in, hon."

His hands curled into fists. "Please. Babe. I'm not talking about Diapers and Dip-Tet money. I'm talking about independent wealth. I'm talking about guard dogs and chain-link fencing: the kind of money capable of keeping out the wackos for the rest of our lives."

"We can handle the wackos," she said softly. "They'll get bored. Didn't you hear what Sheriff Dooley said? Some of them are going home already."

Mark shook his head. "Some of them, maybe. Maybe even most of them—if they behave the way mobs usually don't. But all of them? At home and in school and for the rest of his life? How do we stop some especially dangerous nut, who may be just getting the idea today, from coming after our boy with a gun maybe fifteen years from now? Do you honestly think that everybody who's run out of money or vacation time, and has to go back home to East Calabash or whatever, is just going to forget this kid they were so sure came from outer space? Be real! They'll be back when you least expect them—and if not them, then somebody else. We can't live an ordinary life that way. Hell, I won't be able to hold onto my job as it is—we can't expect me to just go on selling hardware when every yahoo in the country's going to flock to my store to see if I have antennae hidden under my hairline. We need money, babe. If only to protect us from what he's going to bring."

Faye remained as perfectly serene as before, but there was an edge to it now: a willful defiance of the places this conversation was headed. "So what do you suggest?"

He was unable to meet her eyes. "The *Enquirer*'s willing to pay us five million for an exclusive interview—as long as we tell them what they want to hear."

"That your son's a creature from outer space."

"Don't get me wrong," Mark pleaded. "I hate the bastards. But I can't think of any other way. And if they'll be saying it anyway . . . we might as well get paid for it, so we can get the boy what he needs."

"Chain-link fence," she said, without raising her voice. "Guard dogs. Isolation from other children."

"Safety," he countered.

She considered that for several seconds, glancing from the earnest face of her husband to the oddly-shaped head of her child. She'd been raised on a small family farm. She'd seen her parents struggling through droughts; she'd lived through foreclosures and years of lean, grinding poverty. She'd even had to quit the university after only two years, when her student loans were cut. She knew what it meant to need money and not have it. Nobody can say how much the idea tempted her; nobody would have blamed her for going along with it.

But then she said, "No."

"Come on, Faye. Be realistic—"

"I am being realistic. I'm refusing to lie."

"It's a white lie."

"It's a cruel lie," she snapped. "He's our child. Our human child. And it's our job as his parents to stand up for what

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he is, not for what some trash newspapers want him to be. I want him to grow up knowing we defended him!" She took the now-sleeping child from her breast, handed him to her husband, and for the first time, spat out her anger, "You want realistic? Call him by name. I haven't heard you do that yet. You want realistic, call him by name!"

FACE OF SPACE BABY FOUND ON MOON!
Is He Reincarnation of Ancient Lunar Pharoah?

Alexander was lucky, in some ways. Some places would have put the kid in a museum and charged visitors admission to see him—and if you think that's overstating the situation, kindly look up the case of the Dionne Quints. But that's not what happened.

Sweethaven came to see the hordes of morbidly curious as invaders—uncouth, unwanted barbarians who parked on lawns, peered in windows, and dropped their garbage in the streets. What's more, they came to see the Driers as hometown heroes being victimized by outsiders. There may have been a few voices raised against the child, at first (most of them taking refuge in the fiction that he was brain-damaged, and that he'd have been better off in an institution anyway), but as the months went on, and most of the nine hundred people of Sweethaven got to see him up close, even that faded away to silence, replaced by the determination to protect him at all costs.

Mark Drier did not lose his job at the hardware store; he had to miss a lot of time at first, whenever the Nuts and the Media got too obnoxious, but his boss covered for him, and paid him full wages even when Mark couldn't make it in more than one or two days at a time.

Nobody denounced Alexander from the pulpit. At least, not in Sweethaven: there were some churches down south that preached about him as if he had 666 stamped on his head, but Sweethaven's Reverend Wallace Vukcevich assured his flock that he'd seen the boy and that he seemed a perfectly fine baby, odd looks and all.

In the early months, there were two, and only two, acts of serious violence directed against the Drier family. One time, a mentally disturbed woman from Boca Raton, Florida, pulled out a gun and started shooting at the house—but she got off exactly one very wild shot before being wrestled to the ground. It didn't even hit the house. Another time, when Faye was taking Alexander to the doctor for a routine examination, a car filled with tabloid reporters deliberately sideswiped the car so they could force her to stop and get a close-up picture of the baby. The good people of Sweethaven took both incidents very personally. The Boca Raton woman was charged with Attempted Murder, Illegal Possession of a Firearm, Reckless Endangerment, Trespassing, and everything else the local courts could think of; she got the maximum penalty on every count and was awarded a long string of consecutive sentences. The reporters would have been lucky to get off with just that: this was only a few years after the similar incident that caused Princess Diana's death in France, and the small mob of local boys on the scene had a pretty poor opinion of the kind of louts capable of taking that kind of risk with the life of a baby. The tabloid stringers spent almost as much time in the hospital as they later did in jail.

As ugly and upsetting as both incidents were, they only served to cement the town's resolve: Alexander may have been one strange-looking kid, but he was one of theirs . . . a feeling that only grew as he developed a personality, and turned out to be pretty normal after all. He was a child. He learned to smile, to giggle, to say his first words, to crawl, to walk, to manipulate his parents with

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well-placed tantrums . . . and that most human of all skills, to ask questions.

Which brings us to the moment he'd later describe as his earliest memory.

Like most of the rest of us, he saw it on television.

He'd watched TV before, of course. His Mommy was not above occasionally using it as a babysitter. He liked cartoons. He didn't understand why grownups watched the things they watched, which mostly seemed to be other grownups bantering in living rooms. He certainly didn't understand the attention his Mommy and Daddy and Uncle and Aunt gave the program on TV now, which was mostly a bunch of serious-looking people speaking in grim, measured tones. Why was this fascinating enough to keep the grownups from playing with him?

"The arrogance of it," Mark Drier said. "The infernal . . . gall."

"It's just symbolic," Uncle George said. "They're not actually erasing the accomplishment."

"Oh, come on, George! They're doing worse! They're pissing on it! They're telling the whole world that the whole thing was nothing more than a big joke!"

Alexander, who was too young to understand any of this, who was indeed frustrated by his family's helpless fascination for something beyond his comprehension, merely wandered from one relative to another, trying to interest them in more enjoyable activities . . . until the network commentary switched over to the live feed, and something truly interesting showed up on-screen.

It was a strange-looking man in a chubby suit, with a big box on his back and a gleaming mirror instead of a face. There was something irresistably puppetlike about the way the man bounced up and down when he walked: something that struck the young Alexander as both comical and graceful at the same time.

Alexander struggled free of his Mommy's lap, toddled over to the TV, and pointed a single questing finger at the funny man. "Who dat?"

"Get away from the screen, son," Mark said. "We're trying to watch."

Alexander complied as much as his curiosity would allow him, backing up all of two inches. "Who dat, Daddy? Who dat?"

"Alex, why won't you listen to me? We're trying to watch. Be nice."

"You could answer his question," Faye said. She was, by this point, hypersensitive to slights of her son, especially where her husband was concerned: especially in light of the little subliminal flinch that sometimes passed across Mark's face when Alexander fixed those oversized black eyes on his. She didn't give Mark a chance to redeem himself, but instead turned to Alexander and said, "That's an astronaut, honey."

Alexander blinked doubtfully, and repeated the unfamiliar word, "As'not?"

Faye repeated it with exaggerated care, "As-tro-naut. That's what we call somebody who goes to outer space. That man on the TV is walking on the Moon."

Alexander knew what the Moon was. He saw it in the sky all the time, both day and night, and his Mommy had taught him what it was called. But up until this moment, it had never occured to him that it was more than a pale round ball just out of reach . . . that it was an actual place, so far away that there had to be a special name for the people who went there. He stabbed his finger at the astronaut's helmet. "Dat?"

"That's his space suit. He needs that to breathe."

Alexander later told me how his toddler mind processed this information. He thought astronauts wore their space suits all the time, even when they weren't on the Moon, even when they were home in bed, even when they were in the bathtub. It didn't make much sense to him.

Mark Drier said something that couldn't

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have been any help endearing him to his wife, "He's too young, hon. He can't possibly understand this."

Despite his confusion about the spacesuits, Alexander resented that. He understood more than his Mommy and Daddy gave him credit for. Like most toddlers, his comprehension vocabulary was already far ahead of his deceptively primitive speech, and he'd used it to figure out a lot of things they couldn't even begin to guess he knew: among them that his Daddy was a very sad man.

Then the astronaut on TV hopped over a small rock in his path, both rising and falling with unnatural slowness, and Alexander found himself smiling. He turned toward his mother. "I go dere? I be ast-not?"

The assembled grownups met each other's eyes.

And Mark Drier said, "No. You won't."

"Dat man ast-not."

"Yeah . . . well . . . it's different for him."

Alexander asked the dreaded Next Question always asked by children, "Why?"

Mark Drier silently appealed to one relative after another, imploring them to rescue him. "Because . . . nobody has the wrong idea about where he comes from."

"That does it," Faye said.

She rose from her easy chair, picked up her son, and carried him from the room, leaving Mark enveloped by a silence echoing with all the words that would have emerged from a perfect man's mouth.

SPACE BOY DRAWS CIRCLES IN SANDBOX!
UFO Scientists Note Uncanny Similarities To Crop Circles In Europe!

The young Alexander couldn't understand why something as wondrous as an astronaut made the grownups around him so upset.

He was too young to know that he'd been watching the live coverage of the First Saudi Expedition to the Moon.

In the wake of the Third Gulf War, the Saudis, flush with their apparent invincibility, had grown rich enough and fanatical enough and crazy enough to sink an obscene amount of petrodollars into their very own space program—mostly staffed, in a particularly cruel irony, by unemployed veterans of the moribund Japanese and United States space programs. Like Projects Mercury through Apollo, and the Golden Dawn expeditions sponsored by the late emperor, this particular project took the better part of a decade to achieve its stated goal: and though there'd been some who said that the Saudis would change their minds before they got that far, the day had finally come, and the rest of the world could do little but watch as the Saudis did just what they'd said they would do.

Many Islamic factions had never liked the idea of a Western Moon. The Saudis had therefore taken the position that Armstrong, Aldrin, and those who followed them had profaned it with their presence. The entire purpose of their space program was to remove, and destroy, everything that the Americans and the Japanese had left behind during their various missions—starting with Tranquility Base, which they now dismantled before a television audience of two billion people.

Reactions to this varied, depending upon where in the world you were. In some parts of the world, anything that humiliated America was reason to cheer. In others, it was considered a sad victory of barbarians. Even Americans weren't united in their reaction. Some wept for triumphs long-gone. Some were so outraged by the slap in the face they advocated military action against the Saudis. Some thought the whole space program a waste of money better spent elsewhere, and applauded the symbolic burial of Kennedy's folly.

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All too many people simply didn't care—it was too far away, and had nothing to do with their lives. Their vote was heard in the form of over ten thousand phone calls to the TV networks, protesting not the desecration of Tranquility Base but the preemption of their favorite sitcoms. Most of those were of the opinion that the landing on the Moon had been a hoax anyway. The Japanese, and the Saudis, had simply leased parts of Arizona to film their sequels.

I know how I reacted. I was eight years older than Alexander. I cursed at the set with all the rage of a boy who considered the desecration a personal assault, thinking the world a place ruled only by madmen and fools.

I still believe that.

As for Alexander, he never did make it to the Moon. The universe didn't have anything that obvious in mind for him. I didn't make it there, either. It was a world that would never be part of our futures, either shared or separate. But I do look at it sometimes: still just as mysterious, still just as bright in the night sky. And I wonder, in light of everything that's happened since, if the Saudis succeeded only in keeping the dream alive for us.

NEW SPACE BOY SHOCKER: MIRRORS DON'T REFLECT HIM!
Will Parents Still Deny His Origin?

The year Alexander turned four, the science scores of America's high school students hit an all-time low. The President of the United States was caught making major policy decisions on Tarot readings. The newest cult to claim one million converts preached poverty, abstinence, and the worship of the planet Jupiter. And two different prime-time newscasts began devoting five minutes of each program to the astrological readings of singers and movie stars.

I still have a copy of the reading one of those shows gave for the Space Boy himself. "This is a time of growth and learning. Expect major changes in the coming year. But don't forget to depend on those close to you."

A brilliantly prescient horoscope for any four-year-old child.

It wasn't surprising they got around to him. He was, after all, still a frequent topic of the tabloids, and even the comparatively respectable media ran updates on the various milestones of his life. The Driers had even allowed *Life* magazine to do a photospread of him attending the birthday party of one of his little friends—the theory being that pictures of Alexander with pink cake smeared on his chin were the only possible antidote for stories claiming that his real parents were the ancient astronauts personally responsible for the Pyramid of Cheops. Alas, they only helped to keep him in the public eye—and though the good people of Sweethaven kept direct intrusion to a minimum, coverage of Alexander's life was still so ubiquitous that the Driers actually put their TV set in storage to save him from being traumatized by accidental exposure to Space Boy shtick.

No, he had to suffer different traumas entirely.

Take the night he spent one full hour making faces in the mirror. It wasn't one of his favorite games—not because he hated his face, as he hadn't been raised to have such a poisonous feeling, but because his smooth masklike features simply weren't very good at the comical art of grinning. Alexander smiling looked a lot like Alexander frowning, and Alexander calm looked a lot like Alexander angry: there were subtle differences which his family could read, but anybody else had to rely on context or body language. Genuinely funny faces were so hard to make that even Alexander, who was at this point just beginning to get a grasp of how truly odd he looked, knew he just wasn't very good at making them.

Today was different, though. Today he

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was practicing a trick he'd discovered not very long before: i.e. making the world appear to jump side to side by opening and closing each eye in turn. The phenomenon, which also has application in astronomy, is known as parallax, and every child with two functional eyes takes a turn being fascinated by it. He was most enthralled by the way it looked in the mirror—the way his whole head flickered back and forth, just like a bouncing ball . . .

Somebody at the door said, "Alex."

Alexander jumped before he saw who it was. "Oh. Daddy."

Many years later, he'd have to grope for the words to describe his childhood feelings for Mark Drier. There was love involved, of course; Mark had been a good and gentle man, who might have been a fine father for a less unusual son. He'd certainly tried to be a fine father to Alexander, saying the things he was supposed to say, doing the things he was supposed to do, never being deliberately cruel. But he was also a man whose affection seemed forced, a man who couldn't quite conquer that little subliminal flinch he demonstrated whenever his son entered a room . . . a man who had very little to say to Alexander and by this point not much more to say to Faye.

Without ever being struck, without ever being abused, Alexander couldn't help being always just a little bit afraid of him.

And his father knew it, "Sorry. Did I scare you?"

"Maybe a little bit," Alexander said self-consciously. "I was making faces."

Mark flashed a little wan smile at that. "Any good ones?"

"Not really. I think maybe I need a moustache."

Another wan smile. "I think maybe I could use one, too." He held the expression for all of ten seconds before seeming to remember something that pained him—then gathered up his strength, and with a joviality that rang false, said, "Hey, Sport? I know it's near your bedtime, but how'd you like to take a walk with your old man? Just for a few minutes?"

Alexander glanced at the window beside the shower stall. The little sliver of sky visible between the mostly drawn curtains was a shade of purple-blue not very far removed from black; it would not be long before the heavens got the news that the sun was gone for another day. He spoke with caution: "It's dark."

"That's okay. We won't be going far."

"Is Mom coming?"

"Not tonight," Mark Drier said. "But don't worry. She already knows we're going."

He took Alexander downstairs, zipped him up in his jacket, took his hand, and walked him into the backyard. They had a big backyard. They were at the edge of town, just south of the hills, on a slope that was the first of a long bumpy ride to the horizon. Their property was entirely surrounded by chain-link fence, not high enough to keep away determined intruders, but enough to discourage the merely curious. Alexander had seen folks with cameras scramble over once or twice; he'd also seen his Dad chase them away, shouting words that Alexander himself was not permitted to speak. But there hadn't been an incident like that since his last birthday.

Mark unlocked the back gate and walked Alexander to the top of the first hill, home of a jutting slab of rock that the boy was allowed to climb only when his parents were watching. It was a big rock for a kid Alexander's age, almost as tall as his Dad. Mark didn't give him a chance to climb it—just picked him up and put him there, before climbing the rock himself and taking his place by Alexander's side.

They sat without speaking for the several minutes it took the last light of day to surrender to the blackness of night. Mark said nothing because he was a smoker, and a sedentary man, who did not climb hills easily; his ragged breaths burst from him like little explosions.

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Alexander said nothing because his father was holding his hand, which was in and of itself such an unusual thing that he was scared to disturb it with the sound of his own voice.

Time passed. Mark's breathing slowed to normal.

The stars came out.

It was a clear night over a very small town, and the lights burning down below were not enough to force many stars into hiding. Some of them shone like pinprick flames. And as the night grew darker above Sweethaven, and Alexander searched his father's face for the reason they'd hiked all the way up here, Mark seemed less and less a recognizable presence and more and more a man-shaped shadow eclipsing the lights in the sky above him.

Forever came and went before Mark spoke. "You cold?"

"No," Alexander said.

"Tired?"

How could Alexander be tired, when all this was going on? "No."

"Good," Mark said, still without looking at him.

More time passed. So much time that Alexander thought they were supposed to sit here, holding hands, all the way to morning.

Then Mark's profile shifted slightly, and he spoke in a strange, faraway voice that didn't sound like he knew who he was talking to. "You know . . . I used to love the stars. Not astronomy; I was never any good at that. But once upon a time, when I was a kid, I used to pitch a tent on a hilltop not far from here. I didn't sleep in the tent unless it was raining, though. When it was a nice, clear night, like tonight, I laid out my sleeping bag and slept in the open . . . just looking up at the constellations. Some of those nights, time just seemed to stop." He hesitated, glanced at his son, and turned his gaze back to the sky. "Sometimes I wish it did."

"You can wish on stars," Alexander said knowledgably.

"I've heard that. But by the time somebody told me I was too old to believe it." He sighed. "It took me a long time to learn that even if you do wish on stars, you don't always get what you want from them."

Alexander said, "You can still wish."

"That's right. You can."

And because Mark seemed even sadder now than he'd ever managed to seem before, Alexander came right out and asked, "What do you wish, Daddy?"

The shadow in the shape of Alexander's father shifted, no longer a profile turned up but a black oval looking down at the boy. Alexander didn't have enough light to see his expression; the oval contained nothing but darkness. In the silence, Alexander was terribly afraid that he'd said something wrong.

Then Mark squeezed his hand extra tight. "We better get you back to the house. It's getting late, and your mother's going to want to tuck you back in."

Alexander could only be relieved that the strange interlude was over. "Sure." He allowed his father to help him down from the rock, even though he knew he could climb down by himself, and followed him back to the house.

Something else happened late that night, long after he went to bed. Though somewhere deep within the land of sleep, he realized he was not alone. He opened his great black eyes a slit and looked across the pitch-black room to a shape barely visible in the doorway. It was his father, standing with slumped shoulders, one arm braced against the doorframe. Alexander shouldn't have been able to see him at all, since the hall was dark, too, but there was just enough ambient light coming from elsewhere in the house to render Mark Drier's outline crisp and sharp. Too sleepy to get up, Alexander fell back to sleep before it occurred to him to wonder just what his father wanted now. When he opened his eyes again, still surrounded by darkness, the doorway was empty.

The divorce was uncontested. Mark

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Drier moved to San Francisco, where he got a one-room apartment and a job behind the counter in a souvenir shop on Fisherman's Wharf. He didn't aspire to anything else, he didn't marry again, and he didn't get a phone. The few times he received visits from journalists desiring inside gossip about his son, he simply ejected them, always silently, and never with unnecessary force.

Father and Son didn't see each other again for almost two decades.

SPACE BOY GOES TO SCHOOL!
Teaches Classmates Orbital Mechanics

The year Alexander Drier entered first grade, the Jupiter Cult boasted over three million members nationwide. A couple with a million-dollar home in Texas was driven to personal bankruptcy by the wife's seven-digit debt to the Home Astrology Network. Three colleges offered their first courses in UFO abductions during the twentieth century. Psychic surgeons opened successful clinics in New York, Los Angeles, Denver and Chicago—curing nobody but building a sizeable clientele among inoperable cancer patients who had nothing left to lose. And a certain best-selling book, written by the kind of writer who specializes in such things, declared that photographs of the stone face on Mars taken over the past ten years proved beyond a shadow of a doubt that its lips were moving. He claimed that the government was trying to prevent the rock formation from delivering its truly momentous message to humanity—his chief proof an allegation that there were no deaf lip-readers working at NASA.

I own a crayon drawing Alexander made at about this age. His mother gave it to me—no big sacrifice on her part, since she saved all his drawings, and had hundreds of them. It's about as impressive as you'd expect from a drawing made by a six-year-old: stick figures, lollipop trees, lopsided houses, garish color that refuses to accept the authority of the lines meant to hold it in check. Faye Drier stands at one side of the picture, with exaggerated curlycue hair that seems to be made out of wildly askew Slinkies. She is clearly smiling, clearly a figure meant to be seen with love. The rest of Alexander's extended family is also in the picture, though harder to identify. The bald man with the tie is probably Uncle George. The woman standing next to him, a smaller version of Faye, would then have to be Aunt Jude. Aunt Wendy, who lived on the east coast now but visited at least twice a year, stands next to her, identifiable by her big hoop earrings. Then there's a blob of color that must have been intended to represent Alexander's dog, Arnold . . . .

. . . and next to Arnold, Alexander himself, the whole reason the drawing is so important. Because, once you take his limited drafting skills into account, it's an accurate drawing. It shows a boy with a big round head that seems too large for his body, and big long fingers disproportionately long for their hands, and big black eyes shaped like almonds.

In the picture, he's smiling. That's important. Alexander wasn't very good at smiling; his facial muscles weren't really built for it. He couldn't maintain the expression for long. But in the drawing he's smiling, and waving: like for all the world a still from one of those old-time Spielberg movies.

The picture's important because it shows that Alexander, at that age, already understood just how different he looked. He just wasn't self-conscious about it, that's all.

Not even the day Faye brought him to his first day at the local elementary school—a small brick building midway between Sweethaven and Monarch, a somewhat larger town that sat fifteen miles up the road.

Sweethaven and Monarch shared the school between them, in order to make the classes large enough to support a

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teacher for every grade. That was still an average of only ten or eleven children per class. Six of the kids in Alexander's class were natives of Monarch and three of those would now be meeting the Space Boy for the very first time.

On the school's insistence, Alexander was ushered in half an hour late, after his teacher, Mrs. Hirschman, had a chance to deliver her little speech about what to expect. The speech included the standard warning that he might look a little scary, but he shouldn't be treated any differently than anybody else. As a result, the five children who knew Alexander from Sweethaven, and the three children from Monarch who had met him already, were now reminded to consider him odd, and the three children who'd never seen him before watched his entrance with the awed fascination they would have awarded a strange and colorful new species of bug.

As he took his seat, the girl in the desk next to him, Sally Watkins, said the first thing that came to mind. "He looks like a spaceman."

Mrs. Hirschman was scandalized. "Sally! That's rude!"

"That's okay," Alexander said. "I do look like a spaceman."

"That may be true, but we don't like to make fun of the way people look in this class."

"But everybody says it. . . ."

Mrs. Hirschman now definitely had the look of a woman who feared losing control. "It's still not a subject we're going to discuss here. Is that clear?"

Alexander hesitated. "Okay. Sure."

"Thank you, Alexander."

She turned her back, to write something on the blackboard.

He simply followed her with his big black eyes, bemused by her reaction, and wondering just what he'd said to get her so upset.

He looked around at his classmates to see what they thought—and was startled to find several of them staring at him with expressions ranging from loathing to morbid fascination. Those who were looked away quickly as soon as he made eye contact, afraid to admit their interest, scared that he'd notice them as they'd noticed him. He'd seen such reactions before (notably from his dad, and by at most a couple of other people in Sweethaven), but he was treated so normally by his mom and the rest of his family that he'd just written that off as something that strangers happened to do.

Now, looking at the faces of his classmates, it occurred to him for the very first time that this was the way some people looked at boys who looked like spacemen.

It's a tribute to the Drier family and the people of Sweethaven that Alexander, a remarkably bright kid, didn't have enough experiential data to reach this seemingly obvious conclusion until he was almost six. But it still hurt. In this, the first moment where he really had a taste of what it meant to be a freak, he felt so tremendously self-conscious that he actually considered bolting from the room in tears.

Then he noticed Sally Watkins, the little girl who'd called him a spaceman, sticking out her tongue at him.

He blinked, unsure how to react.

She looked away, then turned back, and stuck out her tongue again.

Experimentally, because it was the only response that seemed to make sense, he stuck out his own tongue in kind.

She crossed her eyes.

And he felt better.

Popularity, it seemed, was not going to be a serious problem.

SPACE BOY'S SECRET MISSION ON EARTH!

Veni, Vidi, Vici

In a particularly frightening nationwide poll, astrology became the only "science" seventy percent of Americans

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could identify by name. A certain national news magazine ran a cover story about the prophecies of Nostradamus, and how they'd all come true, sorta. There was another evolution debate in the Department of Education, with Darwin evicted from over half the nation's schools and creationism installed as the officially recognized curriculum. Reports of UFO abductions reached an all-time high, to the point where they were reportedly taking place out in the open, on crowded city streets, with nobody ever managing to get one on film.

Somehow, Alexander learned. He was so anxious to get back into Mrs. Hirchman's good graces that he paid attention to her boring lectures and did all his homework, and before long he realized he was enjoying it.

There was a problem with a couple of local adults who objected to having their kid go to the same school as Alexander. They actually picketed the school, declaring it, "OFF LIMITS TO ALIENS." It was ugly, and stupid . . . but it also died down once the idiots in question realized that nobody was going to buy it. Alexander was the local celebrity. He was the reason the world knew Sweethaven and Monarch existed. They were proud of him. Plus the owners and employees of the half dozen businesses in town owed their increased sales to him, and they knew it.

Time passed.

When Alexander was eight he surprised his mother by announcing that he wanted to become a spaceman. Faye deserves credit for immediately understanding what he meant. "Maybe you better say 'astronaut,' dear."

That seemed reasonable enough to him. "Astronaut," he agreed.

Uncle George, who was listening, said, "You know, son, that's a pretty hard thing to want to grow up to be."

"Why?" Alexander wanted to know.

"Because, right now, there aren't any astronauts."

"There are the Israelis."

Uncle George shook his head. "They'll quit soon. That always happens. We got tired and quit. The Russians got tired and quit. The Japanese got tired and quit. The Saudis got tired and quit. Pretty soon the Israelis will get tired too. I don't know if anybody will still be doing it by the time you grow up."

Alexander was at the stage of life where historical precedent didn't mean a damn thing to him. "That's okay. I'm still going to be an astronaut."

"How?" Uncle George wanted to know. "You gonna build a rocket ship in your backyard?"

Alexander shrugged. "If I have to."

"And where are you going to go?"

"Venus. Saturn. Pluto. One of those places."

"Pluto," Uncle George repeated dubiously.

"It's cold there," Alexander said. "It's cold and Mercury's hot. But I'll go anywhere they want to send me. It doesn't matter where as long as I get to go."

Faye, who was digging up a clog in the sink, grunted, "And as long as you also get to come back."

"Well, duh," Alexander said.

Much later, when the boy was watching Gilligan, Uncle George took Faye aside to bring up a concern last expressed by Mark Drier during the Saudi moon landing. "Listen, are you sure it's a good idea to encourage him to talk about that kind of thing? Let the wrong person hear him talking about going off into space, and they'll turn it into E.T. wanting to go home."

Faye said, "I don't care what they turn it into. I care what my son turns it into."

"Oh, come on—"

"No, you come on. He's eight years old. Are you going to tell him not to dream?"

"He can dream all he wants," Uncle George said. "But you have to teach him to keep some things secret. He has too many people listening to him . . . some of whom would love to hear him talk about wanting to be an astronaut. Don't

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you see that they could twist that into anything? Don't you understand that he's gotten to the age where we're going to have to keep a tight rein on the kind of things that come out of his mouth?"

Faye sighed. "I'm not going to keep him gagged, George."

"It's not as simple as that—"

"I'm sorry," Faye said. "But it's as simple, or as complicated, as my son and I choose to make it."

SPACE BOY'S PLOT TO HYPNOTIZE THE WORLD ON TV!
Don't Watch His Eyes, Experts Warn

When Alexander was ten, he was interviewed on TV. He'd actually appeared on television any number of times before that—starting with his birth, and continuing throughout his childhood, whenever enterprising newspeople went back to Sweethaven for regular updates. But that was just news footage. This was a fully authorized, in-depth interview, promoted on prime time and aired on the highest-rated, most influential TV news magazine of its time. It was considered a coup by all involved—not only by the network and the newspeople, but also by Faye and Alexander Drier.

This was because Faye's refusal to exploit her son's notoriety had prevented the Driers from earning any of the millions that might have been raised by Space Boy merchandise. In supporting him, she'd been helped not only by regular checks from Alexander's absent father, but also by her family, which had helped her maintain their home, and by her community, which had determinedly kept her employed and protected from the worst of the UFO-abduction crazies. But that hadn't provided for much more than necessities, birthdays, and Christmases. And when Alexander, whose interest in astronautics had not faded, and whose bedroom was now overflowing with Saturn V models, Armstrong and Aldrin posters, and models of the solar system, announced that the one birthday present he wanted more than any other was a day at the Smithsonian Air and Space Museum in Washington, Faye had felt her back forced against a wall.

And so she finally let it be known that she was amenable to an interview. As long as whoever performed the interview did it in Washington, providing security and travel expenses for herself, Alexander, one of Alexander's school friends (he chose Sally Watkins), the parents of the child he chose, and two relatives to be named later. So many news organizations leaped on this offer that she'd needed almost two weeks just to decide which one was least likely to provide unpleasant surprises; she chose the one she did, despite its decades-old confrontational stance toward corrupt businessmen and politicians, because it was also a fairly honorable enterprise that could be trusted to take it easier on a kid.

As a result, Alexander enjoyed several firsts: his first trip outside Wyoming, his first airplane flight, his first journey among strangers whose reactions to him could not be safely predicted, his first time speaking for himself on television . . . and one other thing, which he wouldn't find out until two days after the interview aired.

From all accounts, he acquitted himself admirably.

There was the incident on the connecting flight to Philadelphia, when a fifteen-year-old kid across the aisle elbowed his sister and said: "Hey, look. We've been abducted."

"Shut up!" the sister hissed. "You're awful!"

Instead of ignoring them, Alexander leaned over and responded in a spooky voice that carried throughout that entire section of the plane: "Actually, he's right. And we're not really landing in Philadelphia . . . Bwah-ha-ha-ha-ha!"

That made a hit. So did his unannounced appearance at the Air and

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Space Museum, where he found himself attracting more attention than any of the exhibits. He might have ignored the people who gathered around him to gawk. He might have gotten frightened and asked them to leave him alone. He did neither. Instead, armed with his own intense interest in the subject, he became a tour guide: pointing out the Apollo capsule, the Space Shuttle, Skylab, and everything else he recognized from his own reading, explaining what they were and where they had gone in a loud, clear voice that communicated more enthusiasm than factual accuracy. (He was, after all, a ten-year-old.) Midway through his presentation, a local news team arrived and filmed him describing how astronauts went to the bathroom in space—scooping the interview show he was slated to do in three days, but capturing for the very first time on national television his declaration that he was going to be an astronaut himself.

There was more. He went to Arlington, the Lincoln Memorial, the Vietnam Memorial, the Clinton Museum, the Memorial for the Victims of the Toxic Spill in Honolulu. He spent one sad morning in the National Holocaust Museum, silently moving from one exhibit to another, speaking only when he encountered the Nazis' own footage of a dwarf executed for his deformities. Alexander's response upon realizing just how doomed his own life could have been (an angry "Were all these people stupid, or what?") made the news that night. The local anchorman joked about comments from an alien visitor. I remember wanting to kill him.

Alexander's live interview turned out to be more than a way to cadge a free trip to Washington; it was also a masterstroke of public relations on the part of his mother. Because it was the last thing the UFO fanatics had expected: nothing more than a friendly conversation with a bright, articulate ten-year-old. Alexander talked about his favorite teachers at school, what TV shows he liked, the things he'd seen in Washington, even his dinner with the President (breaking up the host by taking that opportunity to wave at the camera and say "Hi".)

At one point the conversation turned to how Alexander got along with other kids.

Q: Do your friends make a big deal about you being famous?"

A: Sometimes.

Q: Does it change the way they treat you?

A: I don't know. I've never been any different, so I don't have any other experience to compare with.

Q: Well, let's put it this way. When you play *Star Trek*, do they always make you play the alien?

A: No. We take turns.

Q: Do you play Kirk?

A: Sometimes. But everybody says I look more like Picard.

By the first commercial break, most people who'd tuned in to see the Space Boy were already realizing that this was just a smart and likeable kid. Unfortunately, most was not all, and polls revealed that there were still twenty million Americans more convinced of his extraterrestrial origins than ever before.

Part of that may have had something to do with the third segment, which turned out to be Alexander's eulogy for the space program. He talked about John Glenn and he talked about the walk on the Moon and he talked about the space shuttle and he talked about wanting to be an astronaut and he talked about how everybody told him that wouldn't happen and he talked about how he wanted to make sure it happened anyway. He talked about the planets and what they were like and which ones he'd like to visit if he only got a chance. He was, as it happens, particularly enthused about Mars, and he said he'd rather go there than just about anywhere else.

The final segment culminated in the

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moment of self-description that defined Alexander for millions of Americans:

Q: Do you really think you'll be an astronaut when you grow up?
A: One way or another.
Q: What does that mean?
A: It means that I'll do whatever I have to to make it happen.
Q: And then you'll really be the boy from space.
A: No. I'll never be the boy from space. I'll be . . . *(groping for a phrase)* . . . the astronaut from Wyoming.

I was on the phone to the studio thirty seconds later.

WHAT WAS SPACEBOY'S REAL MISSION IN WASHINGTON?
Congressional Leaders Refuse to Comment

Two days later, the Driers were surprised in their hotel suite by their network liason, Ms. Wallace. The woman's manner was so hesitant that Faye Drier, who answered the door, immediately assumed that something terrible had happened back home.

"Oh, no," Ms. Wallace colored. "I'm sorry. It's just . . . well, it turns out that there's something else we'd like to ask Alexander to do for us. . . ."

Faye was on guard at once. "The deal was for one interview. Not two."

"I know, and we appreciate that . . . but this isn't about an interview. We don't even need him to appear on TV again. It's . . . well, it's somewhat special . . ." The woman peered over Faye's shoulder, saw the pajama-clad Alexander emerge from his bedroom, and spoke more quickly, "We would have told you before, but we got almost five thousand phone calls during the broadcast . . . and, well, it took a while before this one was reported to somebody with authority to make a decision . . ."

Faye, still suspecting the worst, unchained the door and ushered the poor woman in. Ms. Wallace sat on the couch, said hi to Alexander, looked at her hands, and went on: "The call came from an . . . unfortunate young man in Georgetown. That's a residential neighborhood here . . ."

"I know," Alexander said.

"Well, we checked this out very carefully, and he's real. His name's Colin Forsythe. He's . . . well, an almost complete shut-in. Severe muscular dystrophy, can't walk, can't do much with his arms. He was five years old before his parents and his doctors realized he wasn't hopelessly retarded. But he's far from that—he got his high school equivalency at fifteen, and he's now working on an on-line physics doctorate, through a special curriculum devised at George Washington University. He's also a big fan of the space program, just like you. And when he saw the show, he called and asked if it was possible for you to visit him."

Faye's frown had softened considerably. "And I suppose you want to have a camera there so you can show their conversation on television?"

Wallace shook her head: "I'd be lying if I said it hadn't occurred to us. But we're not asking for that. Under the circumstances, we're just passing on the message."

Faye looked at Alexander. "It's up to you, son. I won't push you either way."

Alexander's response was immediate: "Can we go right after breakfast?"

Cue me.

SPACE BOY VISITS INVALID!
Promises Cure for All Human Illness

Alexander later said that walking into my room was like returning to his own. The obsessions on display were the same: identical posters of Buzz Aldrin vying for attention among mockups of the Saturn V, the lunar module, skylab and the space shuttle. The only real dif-

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ference was that there was more of it: in part because my family had a lot more money than Alexander's, in part because I was eight years older and had been nursing my obsession for that much longer, in part because I didn't have any of the other distractions of childhood. I had about a thousand more books just in this room alone, and a much faster computer than the second-hand model Faye had been able to afford. And I also had one puzzling decoration, hanging in what appeared to be a place of honor, that Alexander would have to ask me about: a poster of my personal hero, an emaciated, grimacing, but oddly buoyant man in a wheelchair. (He hadn't heard of Stephen Hawking yet.)

Of course, he also had me to look at.

Like Alexander, I can be a pretty startling sight. Because my condition manifested itself at a very young age, my arms and legs never really had a chance to develop: they're flabby, childish things too small for the torso that connects them. Because of these proportions, I can't use a normal wheelchair; instead, I lie strapped in a recliner that holds me much like an egg held in the palm of a hand. The brace on my neck keeps my head from lolling to the side, and my face, framed by long greasy hair and marked by what is usually two or three days of stubble, makes me look like a degenerate infant. All in all, I look like a cartoon drawn by somebody with no knowledge of anatomy. Most people seeing me for the first time avert their eyes at once; I can judge their characters by how quickly they manage to steel themselves for a second try.

Alexander, who was used to that look himself, didn't avert his eyes at all. "Hi," he said.

My speech synthesizer responded, "Hello. Come . . . in. Sit down . . . on the bed."

He obliged. On his way over he didn't go out of his way to maintain eye contact. But he wasn't fighting it either; I think he was just fascinated by all my stuff. I can usually tell if I'm going to have anything in common with somebody by how frequently they glance at my bookcase. Some folks only pretend to look because they find it preferable to looking at me. But I can tell who's faking and who's genuinely interested. Alexander clearly saw a dozen books he wanted in the time he took just crossing the room. Then he lowered the railing on the bed, sat down, and smiled at me.

"Thanks . . . for coming," I said.

That's the last sentence I'll write that way. It's there only because it's the way I sound. The synthesizers make my voice comprehensible, but it still takes most of my lung capacity just to get out a few short syllables, so my sentences are always filled with pauses. These days, when my words are often reported for the printed page, some reporters waste entire manuscripts putting ten sets of ellipses in each sentence. It's a cute trick, but it tends to get on the nerves awfully fast. And it's unnecessary, too. My friends and family mentally edit out the pauses. If you absolutely need my cadences, add them yourself with a ballpoint.

Alexander said, "Well, I don't get to meet a lot of other people interested in space. Most people think the space stuff is just me being weird because of the way I look. Even my Mom, I think."

"And your Dad?"

Alexander answered a bit too quickly. "I have no Dad."

I said, "Too bad. I have a Mom and a Dad, and they're pretty good people, most of the time. But I didn't call you here to talk about them. I wanted to ask. Have you ever read Heinlein?"

"Not yet," Alexander said. "I've seen the books around, though. The last thing I read was *The Hobbit*, and . . . "

I must have grimaced more than usual. "Elf Crap! God save me from Elf Crap! I'm talking about the real stuff! Science Fiction, not Elf Crap!"

Alexander was a little startled by my ve-

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hemence. "Uh . . . you mean like Asimov?"

"Or Niven or Barnes or Brunner. Any of those guys. But I'm specifically thinking of Heinlein. A story he wrote called 'Waldo.' All about somebody like me, with a body barely strong enough to pick up a pencil on Earth, who coped by living on a satellite in free fall. With no gravity holding him down, he could move around and do what he wanted and be as independent as he wanted to be. Of course, he also needed to be obscenely rich just to afford it. My parents are rich, Space Boy. But I don't think they'll ever be that rich. And I'm not exactly astronaut material, so I don't think anybody's ever going to send me on a mission. So that's one dream that won't ever come true. Not for me." I hesitated, just long enough for Alexander to know it was deliberate, and not a pause created by the speech program. "But you. Were you really serious about wanting to be an astronaut?"

Alexander blinked. It was the first time anybody had ever asked him that without adult condescension, giving it the weight of a real question. He actually had to think about it. But once he did, the resolve just clicked right into place, like one crucial piece of a puzzle he'd been assembling all his life. I could hear the surprise in his own voice as he said it: "Yeah. I was."

"You picked a hard career," I said. "There are no astronauts anymore. Even the Israelis pulled back."

"So people keep telling me."

"And so they tell me, too. What they fail to realize is that we've been going into space prematurely. We went before we had all the tools. We went when we knew so little that we had to spend billions just to get there and back. We went with a technology so primitive that only a miracle prevented us from having more *Challenger* explosions. But we went. And the more time passes, the more inevitable the second try. Because everything else we're developing in the meantime, without even trying—more and more advanced computers, more and more advanced insulation materials, stronger plastics, more and more efficient fuel delivery systems—is going to make it cheaper and easier to go again. Before long, space will belong to corporations instead of governments." I lifted a finger for emphasis, which is about as much as I can manage. "I've been keeping track of those developments, Space Boy. Very close track. And my most conservative guess is that this country will be returning to space in a big way within at most the next fifteen years . . . which just happens to be my life expectancy."

Alexander blinked several times in rapid succession, as our shared dream took shape in the air between us. "Wow."

"So I ask again. Do you really want to go? Are you really willing to work hard and do whatever's necessary?"

He was ten years old, but he grew up in that moment. "Yeah. Whatever it takes."

This time I smiled widely before I spoke.

"You just hired a manager. Do what I say and we'll get you there."

SPACE BOY SHOCKER:
"I'm Gay," He Announces At Breakfast

We didn't see much of each other for the first few years after that. Alexander still had grade school to finish, and I couldn't travel without compelling reason. We racked up some big phone bills, though, making plans, keeping our mutual enthusiasm high, setting up supplemental courses of study, setting up an exercise regimen designed to put him in the top ten percentile by the time he reached adulthood, and—too often, for me—averting the crises that may seem like life or death at the time but are just, for most people, part of the cost of growing up. There were times, in those years, that I cursed Alexander's absent

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father, not out of sympathy for my friend, but self-pity for the amount of time I had to spend giving the heart-to-hearts that a Dad would have.

Once, when Alexander blew two math tests in a row, he called me up all in a sweat to say that he was washed up. He couldn't be an astronaut, let alone read all the tougher stuff I kept sending him, if he couldn't even understand algebra!

I pointed out that Einstein had failed math in school, and added, "How many of the other kids in your class blew these tests?"

"About half of them. But they don't study. I studied! I studied hard!"

"That's your problem," I told him. "You psyched yourself out. You were so afraid of blowing it, you left yourself no other option."

"Huh?" he asked.

"Elementary psychology, Space Boy. The self-fulfilling prophecy. You were so worried about learning it, you couldn't concentrate on what you were studying. So relax already. Go fishing or hiking or whatever you do out there in boonieland. Take it a little at a time, and you'll eventually pick it up."

"That's easy for you to say. You already know everything."

There is nothing more sobering than the discovery that you've influenced an impressionable young mind into worshipping you. I looked at the clutter of books and papers on my desk, which I couldn't even read unless I could first get somebody to clamp them to the book-holder attached to my chair, and at the unfinished document on my word processor, which had been mired on page fifteen since early the previous morning. "Yeah, right," I said, damning the voice-synthesizer for its inability to convey sarcasm. "I'm just writing my doctoral thesis to prove how brilliant I am."

He laughed, but it was an uneasy laugh that trailed off fairly quickly. "What if I flunk the next test, too?"

"Then it'll be time to find yourself a girlfriend," I told him. "A smart girlfriend who can teach you math while you're distracted."

"Yuck!" he said, and I smiled. Right on target. Now he had something else to worry about—something not related to becoming an astronaut. The stick to go with his carrot. That particular stick would only work for another year or two, of course—at which point I was sure another one would come into play—but that was the nature of our relationship. Being motivated was his job. Keeping him motivated was mine.

The threat of having to study with a girl pushed him through basic algebra, and his renewed self-confidence pushed him right back into the straight-A track he'd been on since he started school. I sent him off a fresh batch of assigned reading and went back to my thesis (a feasibility study of nuclear-powered ion rockets for a manned mission to Mars).

My advice to go fishing had unexpected consequences. He asked his Uncle George to take him, and caught half a dozen brook trout on his first time out. In the process he discovered that he liked the outdoors. He became quite the fly-fisherman, in the most remote locations he could find, enjoying it in large part because it was one place he was able to pretend, at least for a little while, that there was no difference between him and the rest of humanity. It didn't stop him joking on the phone that his big head scared the trout the moment they saw him. I told him it proved fish had more intelligence than we gave them credit for. He threatened to use me as bait. When he sent me a picture of himself wearing a floppy hat Faye had made for him, one of those vests with a bizillion pockets on it, and hip waders, I told him he looked like a redneck.

"What's a redneck?" he asked.

He'd lived in Wyoming for a decade and didn't know the term. People had apparently been too busy calling *him* names. "A redneck is the exact opposite of a space alien," I told him.

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It made his day.

Seventh grade wasn't much trouble for him. He had to ride a bus twenty miles into Sheridan to attend junior high, but most of the kids there already knew him, or at least knew about him, so he didn't have to face more than the usual amount of idiocy. He studied on the bus, went fishing on weekends, continued to work on improving his time for the mile, and generally enjoyed himself.

Then he really did get a girlfriend. Actually, Sally Watkins, the same girlfriend he'd had since first grade . . . but it meant something different now.

You'd have thought he'd invented teenage angst. I got phone calls at all hours of the night. He was on Mountain time and I was on Eastern, so I had two time zones working against me, but he didn't care. He called up to report every new development, from hand-holding all the way through his first kiss to their first argument after that.

"Look," I told him one Sunday at about five A.M. "She's a girl. You're not supposed to understand her."

"That's comforting."

He whined about how she was all smiles and friendly when they were alone, but hardly spoke to him at school.

"Be glad it's not the other way around," I told him. "Now go to bed."

"That's the problem. She wants to go to bed with me."

He sounded so forlorn I had to laugh. "This is a problem? You're what, fifteen? And bouncy little Sally wants to jump your bones? No offense, but the way you look you're probably not going to get a whole lot of other offers." (I was wildly wrong about that, but then I had no real experience myself and had no idea how much certain women would be attracted to novelty—let alone to the increasingly remarkable person behind the strange looks.) "I'd go for it," I told him.

"You know what'll happen if anybody finds out," he said.

"What? Her daddy'll come after you with a shotgun?"

"I wish. No, half a dozen tabloids will come after me with reporters. I can see it now: 'Alien Monster Wants Our Women!' or 'Kill it Before it Multiplies!' They'll mess up my life again, and probably hers too."

It was the first time I'd heard him complain about the press. It was the first time he'd even indicated they bothered him. I took it as a sign he was growing up. "Hmm. So you'll have to be careful. Shouldn't be that difficult out there. There's all those woods, right?"

"It's October," he reminded me. "Hunting season."

He may not have been an alien, but he definitely lived in an alien land. The image of Alexander stuffed and mounted on somebody's wall flitted through my head—not entirely unpleasantly, given what he was putting me through. I sighed and said, "Then borrow your mother's car and use the back seat. Or sneak her into your bedroom. I don't know; do I look like the sort of guy who knows this kind of stuff?"

There must have been an edge to my voice. After all, the sort of gymnastics he and his sweetie wanted to do would probably have killed me. Not that I stood much of a chance of ever finding out . . .

He must have suddenly remembered that he was not the only person in this conversation with problems. "Sorry, Colin," he said. "I shouldn't have bothered you. Not with this. I'm just all confused about it and don't know what to do." He paused, then asked, "You really think it's okay if I—?"

"Yes, yes, go get your ashes hauled, Space Boy!" I said. "I don't care what else you are; you're a teenager. Now that Sally's brought it up, so to speak, your not going to be able to rest until you've learned what it's all about. So do it already, or we can both kiss your ability to concentrate goodbye."

"All right, all right," he said. "Sorry I asked."

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"Stop apologizing!"

"Uh . . . okay. Sor . . . I mean, thanks."

He was about to hang up when one last thought intruded. "Hey. Remember to wear a condom."

"Uhh . . . that's a problem." He turned all sheepish: "I'm not sure I could walk into the store and ask for a pack without causing a riot. Forget the tabloids. The news would get out, and the parents of every teenage girl within fifty miles of here would lock their daughters in their rooms."

He had a point. "Sit tight, then," I said. "Don't do anything stupid until you hear from me again."

And so the next morning I took one of my infrequent forays out of my room, down the street in my electric scooter to the corner market, to buy a box of condoms. I bought the giant economy sized box, and grinned my silly spastic grin when the cashier gave me a "what could you possibly want these for?" look. Let her wonder.

FACE ON MARS SPEAKS!
It's Crying for Help, Experts Say

Alex and Sally were apparently discreet. I didn't see anything but the usual drivel in the tabloids, and I didn't get any more frantic calls in the night for a while. Of course when they broke up a few months later I heard all about that, but it wasn't as big a crisis as it might have been; Alex was beginning to discover that looking like an alien was a distinct advantage in the world of curious women. By the time he entered high school and started playing the "been there, done that" sophisticate, he was ten times more insufferable than he'd ever been as an anguished virgin. I hated him, and let him know it frequently.

Of course, I would have hated him even more if he hadn't made valedictorian, let alone gotten the full scholarship I helped him apply for.

His speech was about Taking Back The Moon. He'd read it to me a week earlier. It was stirring, emotional, eloquent, and absolutely designed to get front-page attention from the tabloids. The local papers said it was brilliant. The video chip he sent me confirmed that it was. The tabloids ignored it entirely—I like to say because it was intelligent, but more likely because that happened to be the week a fifth-generation member of a certain well-known political family got caught sharing a Memphis hotel room with half a dozen bed-partners of assorted sexes and species. You know the one . . . and I'm happy to report that Alexander, being of the proper age, made as many foul jokes about the incident as everybody else did. It may not have been nice, but it was human.

My doctoral thesis was published, and I even made sure copies of it got to the right people, but only one guy had ever returned my letters. He was very enthusiastic, and I felt a brief thrill at the thought that NASA might actually do something with it, until he told me that he had rescued it out of the wastebasket in the administrator's office. He was a janitor. He had wanted to be an astronaut, too, but that was the closest he had come.

The turnaround, when it happened, came from the last place I would ever have expected: the tabloid-reading public. Regular newspapers had long since become indistinguishable from tabloids, so that included just about everybody. Even daily papers ran articles on Elvis or Madonna sightings right beside the national news . . . and occasionally they would do a piece on Space Aliens. Alexander still got a lot of press, since he was a constant source of new photographs for them, but the article that tipped the scales for the space program was something else entirely.

Some poor drudge of a reporter, stumped for material and facing a deadline, must have been digging through back issues looking for something he could plagiarize when he ran across an

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article on the Martian pyramid and the mysterious face that supposedly looked out from the regolith beside it. Of course he didn't know that the Mars Orbiter program in the nineties had pretty much debunked the whole idea with detailed photos from a hundred miles up, but if he did he wouldn't have cared. He had an article to write, and suddenly he had a topic.

When the paper came out, demanding that the U.S. go back to Mars and find out what the face was trying to communicate to us, nothing much would have come of it if the reporter hadn't found an ingenious way to eat up twelve more column-inches of space. He had printed a clip-out form for people to sign and send to the President.

He had no doubt intended it as a simple gag, but he had underestimated his audience's credulity. A flood of clip-outs poured into the White House, many of them accompanied by long letters from people who couldn't resist the chance to tell the President just why this was so important. A sizeable number of people were of the opinion that the face was Jesus. As other papers, not to be outdone, joined in with clip-outs of their own, the issue, stupid as it was, became the talk of the nation. When the President ignored the letters, papers printed more articles crying "coverup!" and exhorting their readers to send even more letters. Within a week they were arriving by the ton.

The President was no fool. He knew the controversy was ridiculous. But an election was coming up, and the economy was in the middle of a long downward slide, brought on at least in part because we weren't fighting any wars to pump money into the big defense contractors. He needed something to toss money at. Something that would capture the public's imagination in terms people could understand. If the public wanted to go to Mars, well then, he would lead them to Mars.

He called an old college buddy of his who worked for NASA, a former janitor who had gotten his Ph.D. and worked his way into the mission planning office, and he suggested that a Mars proposal would receive serious consideration in congress. But he would have to work fast. The election was only a month away, and the President wanted to drop a real proposal on the public at the last moment. His buddy said, "I already know how to do it," and dusted off his copy of my doctoral thesis.

Then the President called a dozen of the most influential senators and representatives into his office and showed them the piles of mail.

They were no fools either. Or maybe they were just fools enough. They were certain that a mission to Mars was a big waste of time and money, but they were willing to support it if it would get them reelected. So in a resounding speech on the night before the polls opened—way too late for a rebuttal from the opposition—NASA suddenly got its first new mandate in decades: Landing an American on Mars.

SPACE BOY THREATENS MURDER!!

Heroic Photog Captures Full Scope of Rampage

Political correctness may not be the worst affliction of the twenty-first century, but it's certainly the silliest. Even when I was a kid people grew uncomfortable if someone called me "crippled" rather than "differently abled," but nobody could actually be fined for it. Nowadays I could pull mandatory counselling time for calling myself a crip, much less a gimp or a spaz. At the very worst I am "moto-neurally challenged," and even that has a negative connotation that makes people uncomfortable.

It also opens doors. Wide open. In their pathetic attempts to ignore reality, the arbiters of morality and sentimentality in our culture have decreed that people are not to be discriminated against in any way, not for reasons of race, creed, color, age,

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gender, sexual preference, marital status, economic condition—or ability. Especially not ability. Goodness no; that would mean someone was actually better at something than someone else, and that flew directly in the face of conventional wisdom.

Combine that with (a) affirmative action, which came back with a vengeance after its repeal at the turn of the century, and (b) Alex's own marks, which now put him on the Dean's List for the fourth straight semester, in precisely the course of study that I'd mapped out for him, and (c) my own appointment to the Project Development Committee—and Alex suddenly had a perfect shot at his dream. Every minority of any sort had to be hired in proportion to their prevalence in society, which meant that NASA had to hire the handicapped, even for a wildly inappropriate job like "astronaut."

And Alex was one of very few people who qualified as handicapped without actually being handicapped. Considering their other options, NASA was glad to accept him the moment he mailed in his application. It didn't matter that he was still a couple of years away from graduation. In fact it helped them immensely. They had no training program in place and wouldn't for at least two years. They had nothing really for their new astronauts to do until they created one. And in Alexander's case, since he was merely hired as a placeholder anyway, they were happy to put him on the payroll and let him stay in school. Besides, they figured, even if he was only an astronaut in name, his very presence would keep the masses interested.

I called him up the day the news broke. It was, by the way, one of the last times I'd ever call him from the old house in Georgetown; I already had handicap-design specialists fixing up my new place in Cocoa Beach. It would require spending all my salary and much of my trust fund on attendants, drivers, custodial workers, and increased medical costs, but there was no way I'd be able to handle the job offsite—and there was no way I'd ever want to. My clock was still ticking. Still, when I called, it was Alexander's triumph I was thinking about. My voice synthesizer chirped out a greeting as ebullient as it could manage: "Congratulations, Space Boy."

"Don't call me that," he said. "Don't call me that ever again."

That set me back in my anti-bedsore harness. I had called him Space Boy ever since we met. "What's the matter? Tabloid reporters getting you down?"

"Christ yes. I—just a minute." I heard some scuffling, then he shouted, "Get the fuck out of my room!" and there was a loud bang.

"Alex?" I asked. My voice synthesizer wouldn't shout. "Alex?"

He came back to the phone. "A couple of 'em got past the dorm's security system."

"What was that noise? You didn't shoot one of them, did you?"

He laughed. "I may be from Wyoming, but I don't solve everything with a gun, no matter how good it would feel. No, I just kicked one of them in the balls, grabbed the other one by her tits and shoved her out of my room, and slammed the door in their faces."

"Ouch. That's getting kind of personal, don't you think?"

"And they're not? I'm tired of being called 'Space Boy.' I'm tired of being called a freak. I'm the only guy in the world those bastards can make fun of because of the way I look, and they're driving me crazy."

I heard more pounding as he said that, but I couldn't tell if it was on the door or him banging on his desk. "Are you going to be safe there?" I asked.

He sighed. "I saw two big security guards coming down the hallway. I'll be all right."

I thought about it for a minute. He was used to me pausing to catch my breath; he waited patiently until I said, "You may not want to—you should ex-

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cuse the expression—alienate the press. They're in charge of public opinion these days."

"They're a bunch of sadistic leeches," Alexander replied.

"Powerful sadistic leeches," I countered. "Don't piss them off if you can help it. NASA learned long ago that public opinion is what launches rockets."

"What, now you want me to let 'em in?"

"No. Never let them close to you. No interviews, nothing like that. Never even have a direct conversation with them. It would be too easy for them to twist your words around. But you can still communicate with them, and you can make them say what you want them to say."

"How?"

I was thinking out loud, but I had plenty of time to do it while I paused for breath. "Send out press releases. All the papers will receive the same text, so we can say what we want without worrying about it being misquoted." I laughed, and my stupid speech synthesizer said, "Ha, ha, ha."

"Did I ever tell you that you sound like Boris Karloff when you do that?" he asked.

"Fuck Boris Karloff," I said. "And fuck the press, too. We can feed those bastards anything we want to, and as long as it makes good copy they'll be happy to print it."

"So what do we want to say, besides 'Leave me alone'?"

"How about, 'Making a bold move in support of handicapped people everywhere, Alex Drier, the so-called "Space Boy," has accepted an offer to become one of NASA's new generation of astronauts. Despite the barrage of tasteless taunts he will surely endure because of his unusual deformity, he has chosen to take this step to demonstrate that public humiliation should not stop anyone who is truly determined to blah blah blah.'"

"Brilliant," he said, his tone of voice making it clear that I was anything but. "I especially like the 'blah, blah, blah' part. Truly inspired."

"Thank you. So what sucked about the rest of it?"

"You used 'Space Boy' yourself. And you called me deformed."

"Better we say it than the press. The way I said it, you'll get sympathy. It'll make the press look like the bullies they are. And the only way they can fight back is to quit printing articles about you, which is all we really want anyway."

"Well, that's a point," he said after a moment's thought. "Did you save that?"

Everything I say is held in a temporary scroll-back buffer. I recalled my impromptu press release and saved it permanently, then said, "Let me work on this for a few minutes, then I can transmit it to you and you can print it out and take it to the reporters."

"I thought you said I shouldn't ever—"

"Right. Have one of your security guards take it to the reporters. Print out only ten copies, and make them fight over 'em like the snarling dogs they are." I laughed again. "Ha, ha, ha. It's time we took the high road, metaphorically as well as physically."

SPACE BOY STARTS TRAINING
"He's a Natural," Says NASA

It didn't work as well as we'd hoped it would, at least not right away. The tabloids weren't bothered by inconsistencies between their stories and anyone else's; in their world that simply proved that everyone else was lying. We did manage to direct the stories a little bit, though, and over the next couple of years we got better at it. Enough so that the media attention at least didn't grow any worse as Alexander became more of a public figure.

Even so, America's first four Mars astronauts were as whitebread as the Mercury seven. And so were the second crew, and the third, and the fourth.

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NASA may have had to hire minorities and the handicapped and the gay-lesbian-old-Baha'i—they even hired me, as a designer, before they realized I actually knew more than the rest of them put together—but they weren't about to staff their missions that way.

I fought it as best I could from within, but I didn't have that much power. They were using my design for the Earth-Mars transfer vehicle, but that didn't mean squat in the long run. If I made too big a stink, they would have thrown me right off the project without shedding a tear, and I wasn't willing to lose that for anything.

We began testing the ion drive and the crew habitat. The lander was still mired in design snafus, but it was beginning to look like we could actually send four people to Mars and bring them back alive even if we couldn't land them when they got there. I was busier than I'd ever been in my life, and happier, too, even if the stress was taking its toll on my wasted stamina. By the time Boeing actually delivered the lander, I could barely talk at all, and was thinking of switching over to a neural implant—one of the new generation of voice-synths that could read the electrical impulses in my brain so I didn't have to eyeball words off a computer screen. Direct interface was becoming fairly common by that point, but it seemed like a further retreat into infirmity, and I did not look forward to taking that step.

The lander was basically an updated Lunar Module, with separate descent and ascent rockets to cut down on the weight we had to carry back into space on the return trip. That meant the crew couldn't use it to jump from site to site on Mars, but they carried ultralight aircraft for that. It was more efficient to use airplanes anyway. We managed to squeeze two of them on board, along with enough food and shelter for a year's stay.

The clock was ticking. Rumors started flying as to who would crew the mission, even though the selection wouldn't be made for over a year. But Alex was out in the cold. NASA hadn't even given him an orbital flight, and it was conventional wisdom that nobody would be sent to Mars without at least one space flight under their belt.

"What can we do?" he asked me one evening after another request for a mission had been turned down on the grounds that he was needed more in a support capacity than in space. "If I don't get a flight soon, I'll never even get on the backup crew for Mars."

"True enough," I said, slowly and with great difficulty. "I know how frustrating it must feel to come this far and then hit the glass ceiling, but the crew selection is out of my control."

"That's what I keep hearing from everybody I talk to," he growled. "Except that bastard Ferris in the Assoff—" (that was what we called the Astronaut Office, where the crew selections were made) "—who just laughs."

"I'll think of something," I told him.

"What?"

"I don't know. Something. There's got to be a way to show them you're not a threat. That's what Ferris is afraid of, after all. He knows you're a good astronaut, but he's afraid of the kind of publicity you'll get if he actually sends you into space."

"Publicity!" Alex shouted. "Everywhere I turn, publicity is standing between me and my life!" He began pacing the tiny space between my desk and the door. "I hardly even left the house until I was five because my Dad was afraid of what the crazies would do. Hell, that's why he left. Well, if NASA hired me because of the way I look, I am not going to let them use it to stop me from getting a mission!"

I wish I could say his little rant sparked me into action, gave me the brilliant idea that salvaged his career. I'd love to take credit for it, but that's not how it happened. What happened was that he stomped out, mad, and I sat in

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my office until well after dark, thinking with the lights out until I fell asleep.

Alex went home and trashed out his apartment, drinking beer and getting angrier and angrier by the minute.

SPACE BOY'S SECRET MISSION IN CALIFORNIA!
Is Killer Earthquake on the Way?

He should have died in a fiery crash somewhere over New Mexico. That he didn't stands as testament to his skill as a pilot, but not to his calm reasoning ability while intoxicated, because what he did when he got mad enough was check out a T-38—the training jet the astronauts use to fly back and forth from Houston to the Cape—and roar off in a sentimental blaze of glory for San Francisco.

I don't know who was the more surprised when they met. Alex unannounced at your door in the middle of the night could scare the piss out of practically anybody, even his dad. On the other hand, Mark Drier had aged quite a bit since Alex had last seen him. Eighteen years of straight time, the salt air of Fisherman's Wharf, and a lifetime of regrets had all left their mark on him. Alex was taller, too, so it looked to him like his father had shrunk to hobbit size and wrinkled like an apple left in the sun.

To hear him tell it, neither one of them blinked an eye.

"Hi," Alex said.

"Hi," said Mark.

They looked at each other for a moment, then, "Can I come in?"

"Sure." His dad stood aside and Alex entered his one-bedroom apartment. It was lit by a single light in the kitchen, which revealed a reasonably tidy bachelor's home. Dirty dishes on the counter, but not more than a couple days' worth. Newspapers and magazines on the metal table and all but one of the creaky wooden chairs around it. Full bookshelves in the living room, and a big ship in a bottle on top of a console TV.

"You make that?" Alex asked.

"Yep."

"Looks nice. I've always wondered how people get the masts and sails and stuff to fit through that little hole. And how they manipulate it once it's inside."

"Patience," Mark said. "And long sticks with tape on the end."

"You never struck me as a patient sort of guy," Alex said.

It might have been an accusation. His father chose not to interpret it that way. He just shrugged and said, "I've had a lot of free time on my hands. You learn."

"I guess you could." Alex sat down in the gray naugahyde recliner facing the TV. His dad sat on the couch off to the side. "Of course, I've never had much patience either. I guess I got that from you."

Mark Drier's hands were shaking. "Listen, Alex, I—"

"No," Alexander said. "That's not why I came here." He removed a tabloid from his jacket pocket. The headline read: CITY OF IMMORTALS DISCOVERED ON THE MOON. "You never did go to the press, not even after you left home. Why not?"

Mark studied the blank TV screen. "Your mother didn't want me to."

"I doubt if she wanted you to leave, either."

"She wouldn't have wanted me to stay, with what I was becoming." Mark looked back at his son. "I was never built to live inside a goldfish bowl. I could feel myself becoming something I didn't want to be. I think I was actually going crazy. That would have been a disaster for you, and for her."

"You too," Alex said.

His dad snorted. "Yeah, for me too. So I did the only thing I had guts enough to do. I took myself out of the picture. Completely out, and that meant no stories in the paper, not even when I couldn't find a job at first." He shook his head incredulously. "Did you know that your Uncle

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George sent me money for three months until I got my feet under me again?"

Alex felt as if he'd fallen into ice water. Uncle George had never had a good word for Mark. "He did?"

"Yep. Wouldn't let me pay him back, either. He wrote me letters for the first couple of years to let me know how you were doing, but I—I finally asked him to stop."

"Why?" asked Alex.

"I'd already cut myself off from you," Mark said. "I'd already failed you. Every letter reopened the wound."

There was an uncomfortable silence while each man thought whatever fathers and sons think at times like these. Then Alex cleared his throat and said, "I have no problem with that, Dad. I really don't. The only thing I have a problem with is how the media attention screwed up your life. So this may sound kind of crazy, but I want you and Mom to sell your story to the press. Auction an exclusive to the highest bidder. Run the price up into the millions and retire on the proceeds."

Mark laughed. "Nobody'd pay for our story now."

Alex leaned forward in his chair. "They would if you told them they were right about me all along."

SPACE BOY CONFIRMED ALIEN!
Parents Reveal All

Next stop, Wyoming.

Insert a picture of Faye screaming at the top of her lungs. Alex said his ears actually rang afterward. She nearly threw him out of the house, and it was two hours before she allowed Mark to cross the threshold. Only because the idea had come from Alex did she even listen, and only because Mark said he didn't want to do it either did she finally decide to go ahead with it.

"I certainly hope you know what you're doing," she told Alex. "This could kill your career faster than a spacesuit failure."

"Mom, my career is already dead. This is a last-ditch effort to pump some life into it."

"Last ditch effort to make fools of us all," Mark said softly, but he was beyond arguing at this point. He had cast his fate to the winds long ago, and was happy to drift wherever they took him. He was looking around at the house he had left nearly two decades earlier, noting that it needed paint and wondering how the roof was holding up. He had carefully avoided looking too long at Faye, because every time he did that he felt something go wonky in his chest.

"I'm trying to make fools of NASA," Alex protested. "If you've got a better idea, I'm all ears. Metaphorically speaking, of course." He tweaked the tiny little flaps on the sides of his head. Mark looked away; Faye laughed.

"I still don't see how it's going to help," she said.

"Leave that up to me. You just make up the most outrageous story you can think of. Abduction, genetic experiments, off-planet meetings with the Imperial Space Command—even Elvis—whatever you want."

"I don't *want* to have anything to do with it," Faye protested, but she was already weakening. Twenty years of stubborn rationality in the face of rampant crackpottery had left her creative side screaming for release. She actually yearned for a chance to play the loon, at least once. And if it helped her son, she would make sure it was a doozy. The promise of a couple of million dollars didn't hurt her creativity, either.

Alex was back in Houston by the time the story came out. He'd spent his final day of relative obscurity briefing the other astronauts, so when Ferris called him into his office to express his false condolences for the unfair treatment he was getting in the press, Alex was ready for him.

"No, they're absolutely right," Alex said. "I'm a space alien."

Ferris nearly split a seam. "What?"

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"Well, I must be." Alex walked over to the window and looked out at the lush grounds three floors below. "I mean, why else would NASA be holding back a perfectly good astronaut? They've got to be afraid of what'll happen if they send him into space. And the only possible reason for that—"

"You're insane!"

"—is because they're afraid he'll steal the spaceship and go home." He turned back from the window. "Or could it be that NASA's simply afraid the press will make fun of them? Well, welcome to the world of Alex Drier. Now my problem is your problem."

"You can't seriously think this . . . this circus is going to get you a mission," Ferris said, snapping his index finger against the headline.

"I have no idea what will get me a mission," Alex said. "Hard work and determination certainly wasn't good enough. Busting my butt to help train every other astronaut in the corps wasn't good enough. Keeping a low profile to allay your paranoid fear wasn't enough. So I decided to let my parents make some money while they still could. If that means taking some media heat again for a while, well, what's the harm in it? I've survived it before. And I'm grounded anyway, aren't I?"

Ferris loosened his collar. "Look, I've told you a million times—"

"Are you or are you not afraid of the publicity?" Alex demanded. "If you can sit there behind your desk and tell me with a straight face that the media attention doesn't scare you—while you've got a copy of the *Times* right there on top of the heap—then I'll go pack my bags and join a freak show. But if that's why you've been holding me back, I and every other astronaut in the project will tell the press not only that I'm a space alien, but that this whole project is the result of rays beamed into our heads from the mothership orbiting the north pole of the Moon."

"You can't orbit a pole," Ferris said contemptously.

"Damn right you can't. And I'm not a space alien, either, but that's what everyone has agreed to say until you stop treating me like one."

"This is blackmail!" Ferris shouted.

"This is a fucking wake-up call," Alex shouted back. "I'm the best damned astronaut this project has got and everybody knows it. I'm the most dedicated, the most coordinated, the most physically fit, and with the exception of Mary Paiz, I'm the smartest. If you don't believe me, look at the reports from your own doctors and shrinks. There's only one reason I haven't been in orbit yet, and one reason why I'm being shoved off the Mars mission, and that's because you're afraid the press will make fun of you for sending a guy with a big head into space." He snatched up the newspaper and flung it into the wastebasket. "Well, that's where your fear belongs, and that—" he pointed straight upward "—is where I belong. It's your call. But this most assuredly is not blackmail, because your worst nightmare has already happened."

SPACE BOY STONEWALLS PARENTS' SHOCKING TESTIMONY!
Is NASA In On the Coverup?

Ferris suspended him, of course.

He was still free to do what he wanted on-site; he just didn't have any official responsibilities any more. So he spent the next couple of days in the simulators, practicing launch and landing and docking maneuvers. He even spent long hours in the ultralight scout simulator, learning how to fly the ungainly fabric-covered jets in Mars's thin atmosphere. He told me later he figured it was the closest he would ever get, so he wanted to spend as much time there as he could before he was fired.

Ferris noted what he was doing, and took it as another example of arrogant pride. Drier was so damned sure of him-

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self he kept training even when he was suspended! But the techs kept feeding Ferris the performance ratings, and the numbers spoke for themselves. Alex successfully landed on Mars with three thrusters out and a fourth one stuck at full throttle. He correctly diagnosed and shut down a leaking fuel pump in mid-ascent before it could explode, and finished the launch and docking with only two out of three engines. He rode out a duststorm in an ultralight, conserving power and fuel by gliding in the updraft on the windward side of Mons Olympus until the weather cleared enough for him to land. And he survived the death mission, the one that was supposed to end with a headlong crash into Mars no matter what the astronauts did to compensate for all the malfunctions on the way down.

"How did he do that?" Ferris demanded of me when he saw the results. I was the engineering genius; I was supposed to have designed the simulation to be foolproof.

"I didn't think about deploying the scout planes after the parachutes failed," I said. My delight was so great that I spoke at almost normal speed. "Sure, doing that adds drag, but it also means jettisoning both thruster quads on the lower stage and burning up the fuel you need for the return mission in the upper stage quads just to stay upright. He landed it all right, but he would never have gotten it back into orbit."

"Don't bet on it," Ferris said. "That bugeyed bastard did this while his oxygen supply was down to practically zip and the cabin was shaking like a box falling downstairs. The T-handle broke off in his hand—which was NOT part of the simulation—and he fixed it with duct tape without letting the lander pitch over in the process. If there's a way to fix the damage after he got down, I'll bet he'd find it."

"Changing our tune, are we?" I asked him.

He glowered at me. "My tune is none of your damned business. But yes, it's conceivable that I might have made a mistake regarding him. I just hope it's not too late to correct it."

"We don't launch for eleven months," I reminded him.

"I'm aware of the launch window," he replied. He left my office without saying goodbye.

SPACE BOY GOES TO SPACE

"It's my destiny," He says

His first mission was nothing special. I say that with such aplomb, knowing that anyone who goes into space for even the most routine mission thinks it's the most fantastic thing that ever happened to them. Alex was no exception, even though he got spectacularly sick the first day.

His was the first landing mission. The mission before his had tested the Mars Descent and Ascent Module, known affectionately as MADAM, in low Earth orbit. Docking and flight maneuvers had gone well, so the next logical step was to try landing it somewhere. Earth was out of the question, since the engines only developed three-quarters of a *g* of thrust, but that didn't mean they had to take it all the way to Mars untested, either. There's a perfect testing ground only 240,000 miles away.

It's so perfect a person might even be tempted to say God put it there to help us on our way to greater things. That was one theory proposed when the Middle Eastern fundamentalists raised a stink about us returning to profane the Moon they had so recently cleaned up, but it did little to pacify them. The US government didn't really care. By then we were so tired of the constant squabbling that came from that part of the world that we just ignored them and went on about our business.

Alex didn't get to actually land on the Moon. That would have been too much publicity even for a repentant Ferris to

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handle. But he did get to ride along in the Earth-Mars transfer module and test out its recreation facilities while the lander crew did their thing below.

He had fun playing with the entertainment and exercise equipment, the scientific instruments, and so forth. That stuff had all been tested a million times on the ground, but he dutifully put it all through its paces so we could detect any on-site problems before we sent a crew out with it for a two-year mission. About the only thing he found out of spec was a warble in the CD player, which sent Pioneer into a tizzy for a couple of days until the problem was traced to a power supply drain from the gyroscopic stabilizers.

When he tested the surround-sound theatre system, he of course played *Communion Part Six*. Of the alien hysteria movies that came out when he was young, that was the one that most closely paralleled his actual life. It was also the cheesiest and most embarrassingly bad one, with the aliens stomping around flatfooted like Frankenstein monsters and sucking the blood from the poor residents in the fictitious town of Rattlesnake, Montana. Alex had always loved that one, and he hooted and laughed through all two hours and seven minutes of it while Mission Control listened in on the hab module's live audio feed. When word got out that that's what he was watching, it started a minor stampede to the video stores to rent copies of it, and the movie even enjoyed a brief comeback in theatres.

It also reminded people how stupid their fears over his appearance had been. An embarrassed America quietly returned a lot of DVDs to the video stores, and the nostalgia theatres switched over to *Batman Seventeen* in mid-week.

The guys on the Moon landed without a hitch, got out and did a walk-around inspection, practiced a few of the things they would need to do on Mars, then gathered up some rocks for the geologists back home, climbed back inside, and blasted off for rendezvous again. They didn't leave any beer cans behind to intentionally irritate the Saudis, but the lower half of the lander and an inflatable dome are still sitting there doing a fine job of that. And they did deploy and assemble one of the ultralight aircraft for practice at doing it in low gravity with spacesuits on, so now there's a fully assembled airplane sitting on the airless Moon, fueled and ready to puzzle the hell out of anybody who comes along after humanity has vanished into history.

The ascent stage took them back into orbit without mishap, and they flew the hab module back to Earth on a long spiral that took them another two weeks, just to test out the recyclers and fuel cells and so forth. When they finally splashed down, three weeks after they left, Alex was beaming from tiny little ear to tiny little ear. He'd made it to space.

And he was on the backup crew for Mars. When the announcement came out, he didn't know whether to laugh or cry. Backup crew. This was a one-shot mission; unless the first crew discovered underground cities or something like it, he wouldn't get another chance.

"Cheer up," I told him. "Maybe somebody on the prime crew will get hit by a bus."

Some days I look back on that moment and wonder if there really is something behind all the superstitions people have developed since we learned how to rub sticks together to make fire. Don't say your dreams out loud or they'll never come true, don't break a mirror or you'll get seven years of bad luck, and most assuredly don't say anything that will tempt fate, at least without knocking on wood when you say it.

I'm practically paralyzed, okay? I couldn't knock on wood if my life depended on it. I don't believe in that crap anyway. But that didn't stop Randy Parker from stepping out into traffic on

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a busy London street—instinctively looking to the left instead of the right for approaching traffic—and winding up under a tour bus filled with tennis fans on their way to Wimbledon.

It was the first time I ever allowed myself to think—even for a moment, even as grim whimsy—that maybe this Space Boy stuff had some substance after all. Maybe there was a mothership, manipulating things Alexander's way. Maybe that was the only way to account for the way things had always seemed to work out for him.

The difference between me and the UFO nuts is that I'm capable of looking at that hypothesis and saying "Naaaah."

And besides, I don't consider Alex preternaturally lucky anymore.

Not at all.

MARS CREW STOPS INVASION FLEET
Epic Laser Battle Ends in Victory!

Randy Parker's death put Alex on the mission, along with Dave Anderson, Mary Paiz, and Shawnee Sanders, three straight arrows with test scores and simulator records almost as high as his. The press had fun with the idea of sending two couples to Mars. They weren't couples, but nobody denied the probability that they would become couples on the way. It was even worked into the mission profiles, albeit secretly. And if you want me to talk about who did what to whom, you're reading the wrong account. I bring it up because some people have suggested that sexual dynamics led to what eventually happened on Mars; it makes good tabloid fodder, I suppose, but that's not what happened.

As for me, I had plenty of engineering snafus to take care of. The hardware worked amazingly well, which for a project this complex meant we still had one or two major complications a day. Most of them were simple malfunctions that we could fix and forget about, but a few turned out to be design flaws and those had to be reengineered. Those were the scary ones, because you never knew if your changed design would work any better than the first one, or if the different configuration would have a ripple effect that would knock out something else. Toward the end I felt like we were sending four people out into space in a vehicle made more of hope and prayers than of hard metal.

They say a painting is never finished, only abandoned. It shouldn't be that way with spaceships, but the sad truth is that you can always improve the design. Launch windows won't wait for a perfect ship, though, and funding is a finite resource, so all you can do is make the best ship you can with the time and materials you've got, and then trust the astronauts to keep it working throughout the mission.

We didn't do a bad job. I can say with great pride that the spaceship didn't kill anyone. Technically neither did the scout planes, though when a man's body lies a few hundred feet from a crash site it's hard to say that the plane didn't kill him. But even if we'd known about the takeoff instability, we'd still have sent the planes along and hoped for the best. It was too late to redesign them, too late to change the mission profile, too late to do anything but light the rockets and go.

On launch day, the Cape was packed for a dozen miles in every direction, and every television in the country was tuned to the NASA channel. I think it was finally soaking in to a whole generation of people that we were once again doing something great, that there was more to life than just the day-to-day grind. We were about to explore another planet!

There wasn't a dry eye in the house when the clock ticked down to zero and the Saturn VI bellowed its liftoff roar across the palmettos. Even the people who thought it was a waste of money were whispering, "Go, baby, go!" while

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the rocket struggled to lift the spaceship into orbit. I was in the control center, and people later told me that my speech synthesizer was saying, "Don blah huh," over and over again, but what I was really saying was, "Don't blow up, don't blow up!"

Miraculously, it didn't. The Saturn put them into orbit, the final stage launched them out past the Moon for a gravity assist, and the ion rocket kicked in and propelled them gently on toward Mars.

The tabloids went especially nuts during the eight months it took our guys to get there; the grinning vacuousness that seems to affect all astronaut transmissions meant for public consumption—even Alexander's, I'm sorry to say—palled after only a couple of weeks, and was replaced in the headlines by rampant speculation over the "real" reason for the mission. Surely it was a humanitarian gesture to take Alexander home! Or a rendezvous with the Aztecs known to inhabit Olympus Mons! And just what kind of torrid romantic doings were really going on when the cameras weren't rolling? The most amusing of the stories were faxed to the crew until Mary Paiz, speaking for them all, sent back a transmission asking us to stop. If Alexander had a reaction, he didn't show it.

After that they lived in their own private little world. Their recycling equipment kept them alive and healthy, and the entertainment system and scientific instruments (indistinguishable from their point of view) kept them sane, and before they knew it they were braking into orbit around Mars.

They spent a few days sending out communications satellites so they would be in constant contact with each other no matter how far apart they got on the ground, mapping their landing site, and making sure the automatic instruments would continue to take pictures and other readings while they were gone. Then when they were sure their transfer vehicle would be warm and waiting for them when they got back, they climbed into the lander and headed down.

No waiting in orbit for one poor astronaut like the Apollo guys had done. All four went to the surface, and all four would contribute equally to the exploration. We had enough missions planned for everybody to have their fill.

They landed in the Valles Marineris, down at the lower end where there would be lots of flood debris and erosion would have exposed plenty of geological strata for them to study without digging. The valley was so wide at that point that the sides were over the horizon, and all of it was flood plain. The ultralight airplanes would allow them to range farther afield, but that's where everyone expected the action to be.

Except the tabloid-reading public, of course. They wanted to know about the face and the pyramid. Never mind that photos from orbit showed two unassuming hills and a few eroded craters; people were sure that an on-site investigation would turn up alien artifacts by the truckload. When they learned that NASA had scheduled an ultralight flyby only after all the other mission objectives had been met, the ruckus could be heard all the way to Mars.

NASA didn't budge. We released new photos from orbit showing the same thing we already knew from the last orbital survey, and the crew went on about the business of setting up their dome and making their first cautious forays into the Martian wilderness.

Cautious was the word. Mars is barely more habitable than the Moon. The air is thin and mostly carbon dioxide, so the astronauts had to wear pressure suits at all times, but there's just enough of it for a cold wind to suck the heat out of a suit in practically no time. A single mistake could be fatal, and everyone made their share of mistakes. Not long after they got there, Mary slipped with a rock hammer and punctured her pressure suit, but Alex dragged her back to the dome and tossed her inside before she ran out

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of air. Dave didn't reinstall one of the dome's two air recycling canisters properly after he recharged it and nearly asphyxiated them all in their sleep. Shawnee stayed out too long after dusk and nearly froze to death before she could make it back to the dome.

And the ultralight airplanes turned out to be much trickier to fly than we had hoped. The problem was mostly on takeoff and landing, when they made the transition from hovering on their jet exhaust to actually flying. Mars's atmosphere is too thin to make a rolling takeoff practical, especially on rocky ground, so the ultralights were designed like Harrier jets, with vectored thrust engines that could be rotated downward for takeoff and landing. Problem was, at inbetween angles they really affected the wings' lift, and there was a configuration in the middle where the engines didn't have enough thrust for the plane to hover anymore and the wings didn't have enough lift for it to fly, so if you weren't moving fast enough when you went through that phase you fell like a rock.

Alex found out about it the first time he took one of the planes up for a test flight. He was going through the checklist, calling out his actions as he rose to about fifty feet, brought the nose up, and increased the thrust for flight, when he crossed through the dead zone. "Throttle up to eighty percent, engines running smooth, tilting forward to—*shit!*" The stall warning buzzer overrode his voice for a moment, then his words became intelligible again as he said, "—nose down, throttles to full, gaining speed. Starting to feel some response to the controls. Okay, I think I'm flying now, but that didn't feel right at all. I'm going to bring it around for a visual."

"Roger," Dave said. "I've got the binks on you. Don't see anything wrong from here, but maybe when you come around. You sure you don't want to land?"

"Not until I find out what happened," Alex said. He had the pilots' almost instinctive urge to put air rather than rock beneath him when he had a problem. He banked the plane around and did a slow pass over the dome—slow being about a hundred miles an hour in the thin Martian air.

Dave gave him a close inspection with binoculars, but didn't see anything wrong. "Looks copacetic, ol' boy," he said.

The ultralights were mostly wing, since Mars's atmosphere is so thin. Alex waggled them a little, then jounced the plane up and down a bit with the elevator. "Flies like a pregnant cow," he reported. "Just like it did in the simulator. But I never felt anything like that dropout before. I'm going to take it up a ways and see if I can repeat it."

"You sure you want to do that?" Dave asked him.

"I don't want to try landing until I know what happened," Alex replied.

Back home at mission control we were all pulling our hair out. We had a man in the air with a problem—a hundred and fifty million miles away. What we were hearing had happened thirteen minutes ago. Alex could have been dead already and we wouldn't know it until the radio signal carrying his last words caught up to us. We had people in the simulator trying to figure out what had happened up there the moment we heard there was a problem, but even if they figured it out instantly, it would be thirteen more minutes before their solution helped Alex any.

So we hung onto our butts and gritted our teeth while we listened to Alex calmly describe everything he did. "Climbing through eight thousand. I can see quite a ways from up here. Man oh man, a hell of a lot of water must have come through this canyon. It looks like it was cut with a fire hose. Okay, I'm at ten oh and slowing. Bringing the engines backward to hover. Angle at ten, twenty, thirty—there it goes! Get back here, you bastard! Throttling up and tilt-

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ing on back to forty, fifty, sixty. Airspeed down to forty, thirty, twenty. It's looking stable now. Hovering like a balloon. Plenty of control. It's just in that transitional phase where it all goes to hell for a second."

He tried switching back over to forward flight, and sure enough the same thing happened, so he brought it to a stop again and tried it over and over until he learned how to compensate for it. "All right, here's what we're going to have to do," he said as he dropped back down toward the base for a landing. "It'll suck fuel like a tank rupture, but we've got to go up and down like an elevator for at least a thousand feet before we switch flight modes, 'cause we're going to lose a couple hundred feet in transition."

Mary said, "Why the hell didn't they figure that out back home?"

"Who knows?" Alex said. "Planes always act squirrelly at low speed. They couldn't test these things in partial vacuum for more than a few seconds at a time, 'cause they don't have a vacuum pump that'll keep up with a wind tunnel. And they sure as hell couldn't test it at a third of a gee." He laughed. "I'll bet they're scurrying to figure it out now."

He was right about that. Everybody involved in the ultralight design ran for days without sleep trying to understand what had happened and how to correct for it with materials the Mars crew had on hand. They figured it out, too, and cobbled together a fix out of an empty fuel tank and duct tape that reduced the instability to about half what it was originally, but that was the best they could do. The problem was inherent in the wing design, and there wasn't anything they could do on site to correct for that.

So the crew went on with their jobs, flying planes that were ready to smash them into the ground at a moment's notice. It was either that or forget about ninety percent of the mission objectives, but this was our only shot at Mars. There was no money for another mission, and even if the money miraculously showed up in the budget, these four wouldn't be going back. There wasn't any question what they would do. I'd have done the same thing in their place.

I keep telling myself that.

MARS MISSION A COVERUP!
Why NASA Won't Ask the Questions YOU Want Answered!

For months nobody had any more problems with the planes. All four astronauts flew them dozens of times each, and they got so used to the instability that we nearly forgot it was there. With all the new discoveries the crew were making about Mars we had so much else to think about that the airplane problem faded into the background.

When we lost the first plane it had nothing to do with the flight problem anyway. A dust storm got it during the night, plucked it away like it had never been there. Alex said the crew never even heard a noise. They just looked out in the morning after a hard blow and saw that it was gone, and the other plane was missing a couple feet of fabric at the end of its left wing.

They were able to fix that easily enough and go on flying. Fortunately there weren't that many flights left in the mission plan. They had accomplished all the major objectives, and now they were working their way down the "wish list," the extra projects that they could do if there was time before their launch window opened for the return trip to Earth.

One of those was a long-range flight to check another site on the planet for signs of life. They had found dozens of tantalizing clues, including rocks like the one found in Antarctica that contained what might have been fossilized microbes, and colored layers of sediment that had unusually high concentrations of carbon, but they hadn't found proof that life had ever existed on the planet, much less that it existed now.

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That was the one big question everyone wanted an answer to, and it was looking like the crew was going to come home empty-handed.

They had already flown the two-thousand-mile length of the canyon, so when Alex proposed taking a flight of similar length northward to check out another site, nobody argued that the distance was too great. Nobody argued much at all until he revealed his intended landing site: the pyramid and face in Cydonia.

Maybe it was his idea of a practical joke. Or maybe it was revenge. He knew that actual video footage of the area taken from a low-flying plane would ruin the site forever as an object of new-age pseudoscience. Maybe he wanted to get back at the tabloids that had made his life miserable. We'll never know. All we know for sure is that he justified his choice by pointing out that the geology at Cydonia was different from what they had been studying, so since they had come up empty-handed on the search for life where they were, it made a good candidate for further exploration.

And going there incidentally fulfilled the wishes of a large portion of the population who had paid for the mission.

Nobody missed the irony of sending the "space alien" to check out the site. I think Alex probably enjoyed that. And he certainly enjoyed the idea of getting out by himself for a few days. With the prospect of another eight months in a can with his three crewmates coming up, he wanted as much solitude as he could soak in before they left.

So he packed his toothbrush and enough food and water for a week, and took off for Cydonia. He would have to spend a couple of cramped nights sleeping in the cockpit of the plane, but he didn't care about that. He had camped out plenty of times in pup tents on fishing trips in Wyoming; he was used to sleeping in tight quarters.

This had to be the happiest time in his life. Here was a kid from a small western town, a strange-looking kid that practically the whole world had made fun of—making a solo flight a sixth of the way around Mars. He was exactly where he wanted to be, and he'd gotten there despite all the superstitious, credulous, and downright malicious people who stood in his way. And not only that, but he had made his mother proud. Hell, he had made his *father* proud, and that's saying something.

A straight route would have taken him to the east of the Chryse site where Viking 1 had landed, but he took the extra time to fly over it, swooping low and circling around to take pictures of the fragile little lander sitting there on the boulder-strewn plain.

Everyone back home had grown familiar with images of the habitat site from the air. Its bubble and lander and power generator provided a comforting picture of home away from home, a place we could all imagine ourselves living in our dreams. The Viking probe had the exact opposite effect. It looked lost down there among the rocks, a tiny speck of technology amid a vast, forbidding landscape, its dish antenna still pointing into the sky like a hand reaching for the planet it could never touch again.

"That's, um, the Viking probe," Alex said quietly after his third circle around it. "I guess I'll be going on to Cydonia now."

By the time he got there, hours later, his sense of humor had returned. As he approached the pyramid and the face, his onboard video camera showed the now-familiar rounded hills and craters that we know them to be, but he talked as if an entire Martian city were unfolding beneath him.

"Oh my God!" he said, "there it is. Look at the buildings, and the elevated walkways, and the flags waving from the tops of the towers. They look like—yes, yes, they're Buffalo on a field of blue! They're Wyoming flags! Proof positive that this is the site of a massive government coverup. And there's the face.

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Is it a space alien? Sorry to say it doesn't look a thing like me. In fact it looks more like my dad. Hi, Dad." He banked the plane around so the bumpy hill was right in front of him. "Look, it's speaking! What's it saying? Looks like, 'Nyah, nyah, fooled you!' And now it's fading away. Yes, it's turning into just an ordinary hill with craters in it. Oh, what cruel fate!"

He banked away. "Well, what a disappointment that was, eh? I guess I'll just land over there by what used to be its chin and see about doing some real science."

Mary, who had been monitoring his signal over the satellite link, was laughing out loud. Most of us at Mission Control were, too, but a few people weren't. Space flight was a popularity game, and Alex had just cost us some supporters.

He didn't care. I never got the chance to ask him, but I know what he thought of that kind of support anyway.

He brought the plane in high, making his customary "Yee-ha!" yell as he went through the roller coaster moment, then set it down light as a feather on the rocky ground at the base of the hill. He jumped out and tied down the wings so a stray gust of wind wouldn't blow away his ride home, then turned around and trudged through the rocks to see what he could see.

He did not send another transmission for seventeen minutes.

When he did, there was a peculiar strained quality to his voice. "Mary," he said. "Houston. I've found something."

The tone of Mary Paiz' answering transmission clearly showed that she expected another joke announcement. "Copy, Buck."

"No kidding, Wilma. Hold on. Going to visual." He switched on his video camera and broadcast an image of a jagged stone in a field of other stones. "See this?"

"Wonderful rock, Alexander."

"Not the rock. This patch here." His finger prodded a shadowy area. "See this? Well, close up it looks like velvet."

"Velvet?" asked Mary.

"Yeah. It's fuzzy, and I can't get light to reflect from it, not even from my helmet lamp. It looks like—" He paused.

"Like what?" Mary said.

"I was going to say 'lichen,' but it's soft," he said. "Springy. Like some kind of . . . " His reluctance to say the word was palpable.

After about five seconds of dead silence—which seemed like the longest hesitation in the history of the solar system—Mary prompted him again. "Alex? Come in, Alex."

The broadcast image grew as Alexander zoomed in. He described the image out loud in case the transmission wasn't getting through. "Okay. Reality check. At ten power I see little stalks with cup-shaped ends, all packed together so there's hardly any space between them. They're stuck to the rock by more little cups that look quite a bit like the ones on top. I'm trying not to be too credulous here, but that's definitely an organized structure. A biological structure."

"Are you shittin' me?" Mary asked.

"Live transmission," Alex reminded her. "But no, I'm not. This is for real. They look like plants of some sort."

"Holy . . . . Wow. And us with less than a week left on the planet."

"Well, you know how it is. You don't find the souvenirs you want until the end of your vacation."

"Do you see any more?"

"Let me look." Alex stood up and panned around at the other rocks. "Yeah," he said. "Five or six patches of it. No, more than that. Oh, there's a big one. Must be three inches across."

"Get samples," Mary told him.

"Duh," he said. His voice barely betrayed the excitement he had to be feeling, but the biomonitors in his suit told a different story. His heart was racing, and his skin temperature had risen a couple of degrees. He knew he'd just made the history books again, and this entry would dwarf the one about Drier's syndrome or even the first mission to

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Mars. He was now the man who had discovered the first indisputable evidence of extraterrestrial life.

He spent the next two days scraping stuff off rocks, digging in the ground for other organisms, and climbing up and down the hill looking for anything else he could find. He even bagged up one entire rock a couple of feet across because it had four different kinds of growth on it and he thought maybe it would provide some idea of how the Martian ecosystem worked.

And then it was time to head back. He packed his samples in the plane, strapped everything down, and lifted off for home. He took the plane up a few hundred feet, tilted the engines forward—and dropped like a rock.

And kept dropping. Long after the wings should have caught enough air to start flying, the plane still generated no lift. "Shit," Alex said, "there must be a downdraft. Increasing thrust to max."

The plane kept dropping. In one-third gee, he had plenty of time to watch the ground come up at him, but his biomonitors showed his pulse rate barely rising. "It's not going to work in flight mode," he said. "Transitioning back to hover mode." He angled the engines back. "Come on, you dirty bitch. Come on, come *on!*"

We heard the impact. It sounded like someone had dropped a dictionary on a beer can.

"Alex?" Mary called out. "Alex, are you okay?"

"Well, I'm down," he said, "but I wouldn't say I'm okay. Both engines broke loose in the crash. They're doing cartwheels across the rocks now. There, one of 'em stopped. The other one's still rolling around like a pinwheel." He coughed. "Damn. Bit my tongue."

"Are you . . . can you . . . ?"

"Fix the plane? I don't see how. Even if the engines still work, the wings are crumpled like tin foil. But it looks like I'm going to have to figure something out, doesn't it?" He didn't state the obvious: there was no backup plane to come get him.

He got out of the wreckage and hiked through the rocks to the closest engine. It had been battered so badly that it was barely recognizable. The other one had tried to suck in a rock as it was winding down, and what was left of the turbine lay scattered all around it.

"Looks like time for plan B," Alex said.

SPACE BOY MUTINY?!
Did He Intend to Stay on Mars All Along?

There was no plan B. Everyone wracked their brains for a way to get an astronaut two thousand miles back to base without a plane, but there just wasn't any. He wouldn't make a tenth that distance on foot. Dave suggested going for him in the landing vehicle, but Alex vetoed that idea right away.

"It's not designed for suborbital flight," he said. "Besides, even if you could restart the lower stage and fly it, you'd have to rob fuel from the upper stage, and then all four of us would be stuck on the ground until our food and air ran out. If we don't get back into orbit within the week we'll miss our launch window."

"We can't just leave you there," Dave said.

"I'm all for rescue if you've got a realistic plan, but using the lander isn't going to work."

At Mission Control, we had to concur. That was the hardest decision I ever made in my life, even though I was just part of the engineering group and even though I knew there wasn't a real decision. We might have risked the other three for a chance to save Alex, but we wouldn't doom all four of them just to make a vain attempt.

I wasn't the capcom on this mission, but I was Alex's best friend, so I got to deliver the bad news. There was no way to hold a conversation with the speed of

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light lag what it was, so I just made a short speech and had my voice synthesizer remove all the pauses before transmitting it. I won't transcribe it here; all the radio messages from the mission are on file for the curious. There's only one thing to say in a situation like that anyway. You say you're sorry that things worked out the way they did, and you're going to miss your best friend very much, but you want your other friends to come back home safe, dammit, so don't try anything stupid.

There were a lot of tearful goodbyes. Alex's mom and dad talked with him a couple of times, and he told them not to worry, that he'd had a pretty full life and no regrets. "I'd have come here even if I knew in advance that this was how it would end," he said. The newspapers made quite a deal out of that, and for the first time since Alex was born some of them ran an entire article without once mentioning his physical appearance.

Mary wasn't ready to give up. She cursed us all, including Alex, and tried to convince Dave and Shawnee to defy orders and try the lander anyway, but Dave had backed off from that idea after he'd seen how impossible it was, and Shawnee merely said, "Over my dead body. No offense, Alex."

Alex said, "None taken."

Launch time came, and with a great deal of argument but no real hope left, Mary and Dave and Shawnee climbed aboard the lander and rode it back into orbit. The transfer vehicle was still waiting, snug and warm, to take them back to Earth.

And Alex? He did the only thing left for him to do. He studied the lifeforms he had found and transmitted his findings back to us. He told us how the organisms' cupped tops followed the sun, how they closed up at night, and how the whole colony moved, ever so slowly, around the face of the rocks over the course of the day. They weren't quite plants, and they weren't quite animals. They were something else entirely. Alex's description of them was incredible, exciting like nothing else humanity had ever experienced, but we couldn't forget that we were learning it from a man whose time was rapidly running out.

He couldn't either. Occasionally his voice would crack, and he would stay quiet for a few minutes while he got his emotions under control again. Those of us listening were sniffling and wiping our eyes as well. By then we numbered at least half the people on Earth, since the TV networks as well as the NASA channel had started live coverage. I was pissed that they hadn't bothered until someone was about to die, but that's the way the media do things. Science by itself isn't interesting; human drama is what gets the ratings.

Alex knew that. He hadn't spent a lifetime under the media bug-lens without learning what played well and what didn't. He must have been planning his final speech since the moment he knew he was stranded. It wasn't a long one—he knew the average viewer's attention span, too—but he said what he wanted to say at the one moment in his life when he knew people would hear it. And maybe even listen.

It came in the middle of day five. He had had a hard time the previous night, nearly freezing in the crumpled ultralight's tiny cabin when the outside temperature had dropped to minus-sixty. The plane's batteries were dead and his suit batteries were nearly gone as well; he kept from freezing by exercising constantly, which burned up air faster than his recycler could keep up with it. He was down to practically nothing by morning; it was clear he wouldn't survive another night.

He spent half the day finishing up what observations he could make, describing what microscopic details of the "planimals" he could see with the portable sampling kit, but just a little after noon, Cydonia time, he stopped and said, "I think it's time we all had a little talk."

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The video camera was dead by then, so all we have to go on are the radio signals and the orbital camera's pictures of his footprints, but it seems apparent that he climbed up the flank of the hill above the ultralight, stopping at the "chin" and looking south as he spoke.

"I am standing here on an alien world," he said. "I've been called an alien myself over the years, so maybe it's appropriate that this is where I wound up. I certainly can't ignore the irony of my final resting place, a hill with some craters on it that made so many people think there was life on Mars. And so there is, but it has nothing to do with mysterious monuments to anthropocentric thinking."

He laughed softly. "Anthropocentric. Look it up. It's a dirty word, but it's in the dictionary." He must have sat down on a rock; we could hear his pressure suit creak. "I wish each and every one of you could see what I see here. Mars is nothing like Earth. It's got a volcano the size of the United States and a canyon so wide that you can stand in the bottom and not see either side. When I woke up this morning there was dry ice on the ground. Frozen carbon dioxide. The *air* froze here last night. It's like that everywhere I turn. There are more wonders here than we could even begin to imagine . . . and I'm here to see them because we were crazy enough to come look."

He sighed. "Why can't that be the thing that excites our imaginations? Why must we waste our minds and our energy on delusions that we should have put aside long ago? Faces on Mars. Alien abductions. Imaginary beings dictating our lives at every turn. What's wrong with us? We have brains, we have senses; why can't we use them to understand the universe around us rather than make up elaborate fantasies and pretend they're the truth?

"Well, here's a truth for you. I am Alexander Drier. Like the rest of you, I'm a human being. And from this moment on, like the rest of you, I'm a Martian. We all became Martians the second humanity set foot on this world, and because of what we've learned here we'll all carry a little bit of Mars around with us for the rest of our lives.

"Does that somehow diminish our humanity? Of course not. It means we're more human. Because only human beings could have gotten here. We dreamt it, we wanted it, we built it, and we did it. And Mars will always be here, a beckoning light in the sky for anyone else with a dream and the determination to see it through.

"I want you to remember that, when you look at the new face on Mars." He stood up and walked back down the hill, out into the sandy plain beyond.

"*New* face?" asked Mary, in equatorial orbit a third of the way around the planet.

"You'll see," Alex replied.

They didn't see for several hours, until the polar mapping satellite made its pass over him. By then he'd made most of one circuit and he was well into a second one, scuffing up the soil with his boots like a kid making designs in fresh snow.

It was a bit lopsided, as patterns drawn on the ground without surveying instruments often are, but it was perfectly recognizable. A long oval, ballooning out on one end and narrowing down to a pointy chin on the other. Big, almond-shaped eyes filling nearly half the enclosed space. Two little dots for a nose and a single line for a mouth, bent upward at the ends in a goofy grin. Alexander Drier's own caricature.

"Alex, what the hell is that for?" Mary asked when she saw it.

"A . . . reminder," he said. His voice was ragged and he was panting hard. "Besides, people wanted . . . a face. Who am I to deny them?"

She laughed, but it turned into a sob. "I'm sorry, Alex. I'm sorry it has to end like this."

"Me too," he said, "but believe me, it's better than it might have been. At least I got here. Oof!" There was a thump over the radio.

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"Alex?"

"S'all right. Tripped on a rock. It's getting hard to see. Look, I don't have much daylight left, or air either, and I don't really want to make people listen to me die, so I'm going to shut off my radio."

"No! Alex, you don't have to die alone."

"I'm not alone. I've got you, and Mom and Dad, and Colin, and Uncle George, and everybody. I've got all these little whatever-they-ares growing on the rocks all around me. I've got the whole universe right over my head. I'm not alone."

"That's not what I meant. I meant—"

"I know what you meant, but that's not the way I want to go. Look, it's time. Everyone out there, I love you. Try to love each other, too, okay? This is Alexander Drier, signing off."

There was a click as he switched off his radio.

MARS MISSION A HOAX!
Space Boy Spotted Pumping Gas In Wyoming

The next pass showed where he had fallen. He had made it back around to the chin, and had lain down with his arms and legs outstretched, a tiny body to go with the face he had drawn. The orbital camera's resolution wasn't good enough to tell if he had opened his suit or not, but he wouldn't have lasted long either way. With night falling and the temperature plummeting, he would have frozen to death in minutes.

The face didn't last a month, of course. The next windstorm obliterated his tracks, leaving only his body and the crumpled remains of the ultralight airplane as evidence that anyone had ever been there.

But we knew. Alex's last days wouldn't fade from our memory, not for as long as anyone looked up in the night sky and wondered what was out there.

Mary and Dave and Shawnee made it back to Earth with only the usual harrowing adventures. Congress cut NASA's budget the next year, but not as bad as we had been afraid they would, so we cautiously began work on our next phase in exploring our solar system: an orbital habitat that people can actually live in long enough to travel to the outer planets. The first prototype will be tested for a couple of years in Earth orbit, then leased out to the highest bidder for living space. I figure I might just survive long enough to rent some cubic there myself. It won't be Heinlein's Waldo, but it'll be something for an old man who can barely move here on Earth.

In the meantime, life lurches along the way it usually does. The newspapers still carry horoscopes, but they're not on the front page anymore. Government scandals and student unrest have taken up that space again.

And of course the latest Alien Shocker.

Three months ago a boy was born in Mississipi with Drier's Syndrome. His parents are good but simple people who hadn't expected a media feeding frenzy at their front door, but they knew opportunity when they saw it. They've been portrayed as country hicks who ran afoul of an alien mad scientist, but they've already bought a house on fifty acres, fenced and guarded by a dozen rent-a-cops until they can find enough rottweilers and dobermans to do the job for free.

That solved their external problem, but internally they're still going through the same thing Mark and Faye went through nearly thirty years ago.

The Driers aren't answering their mail, so the mother wrote me a plaintive letter, begging me to help her understand her child. Among the things she asked was a simple, straightforward question: Is my son a spaceman?

I intend to answer with the only truth I know, taught to me by my friend, the astronaut from Wyoming.

That's up to him.■

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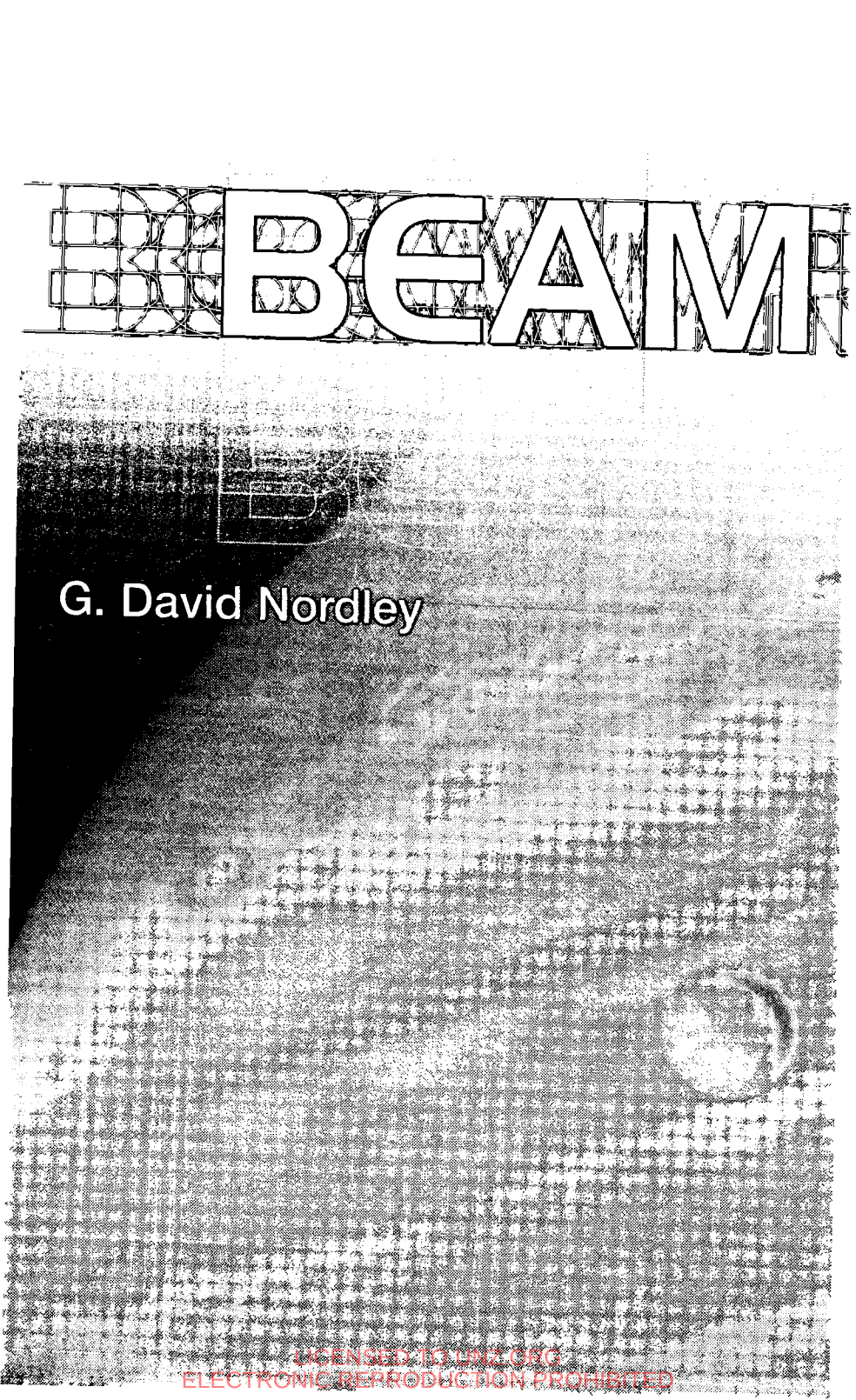
BEAM



G. David Nordley

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RIDERS

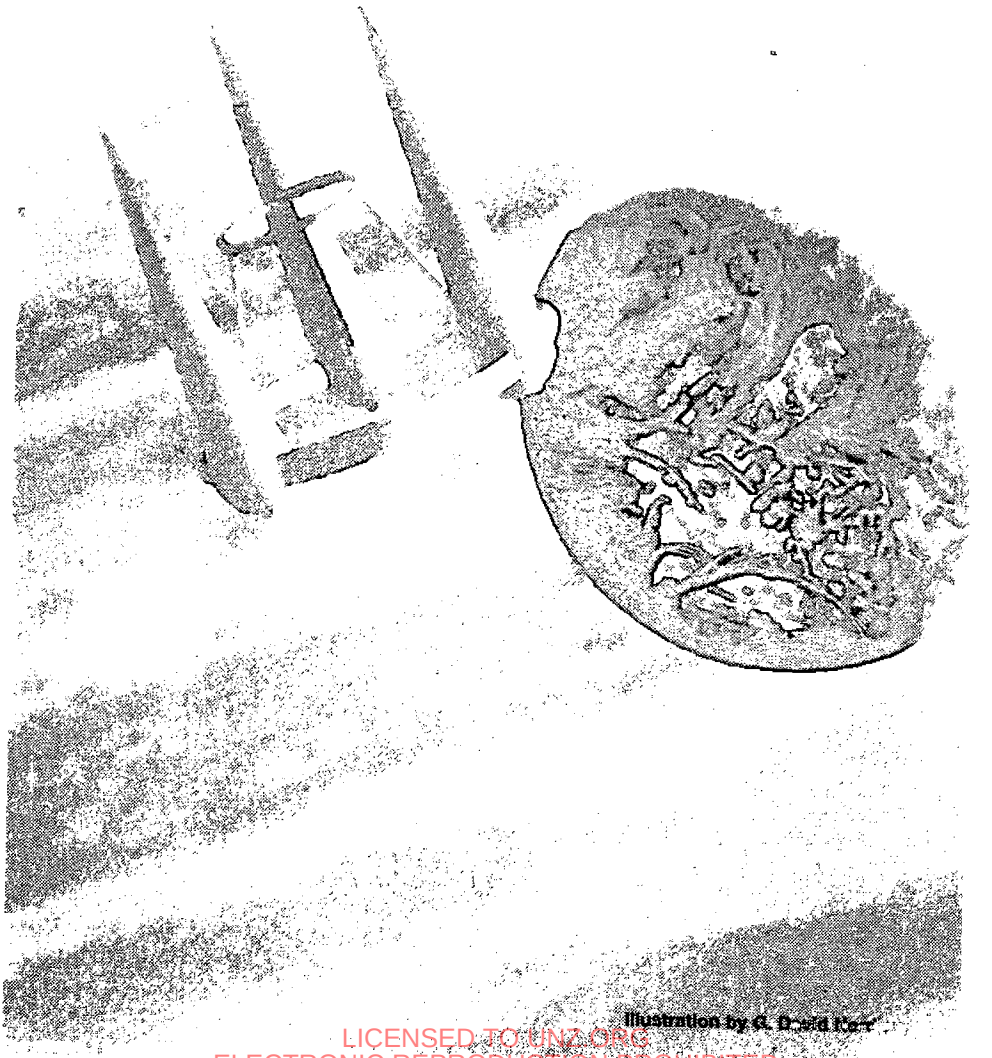

Illustration by G. David Kerr

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The year is 2099. A vast array of solar power stations and mass beam projectors, a thousand kilometers wide and longer than the orbit of Earth's moon, glides along near the L5 point in the orbit of Venus. Its target, a starship, lies a million kilometers toward the southern Milky Way—three long, parallel, teardrop-shaped hulls pointing forward, evenly spaced around a rotating, hundred-meter-radius solenoid ring. The entire array could, at full power, slice an asteroid in half with a mass beam of thousands of terawatts. But it is not a weapon.

The starship crew assembles in a park-like common room in the center of a spherical inner hull nested in the wide part of the teardrop. Overhead panels provide an illusion of transparency; it is too bright to see any stars, but the bright filament of the array and the edge of the Sun circle their "sky" every twenty seconds, as evidence of their rotation. Part of their sky does not rotate. The redundant sister hulls stay fixed and a smaller ring lies forward of the main one and shares the same axis. Its support struts glint as the sun revolves around them.

The ship reports that everything is ready and the crew give the array the go-ahead to fire. A minute later, microscopic particles are spun up, seized by herculean magnetic fields and flung back at the starship with a mere four terawatts of kinetic power. The array is just ticking over.

Bright spots flare on the main ring—the starship's laser. A ghostly violet flower of plasma suddenly blossoms aft of the rings and spreads back toward the array. Weight increases and they feel a slight unease as the spherical inner hull turns to adjust to the new combination of centrifugal and lateral acceleration. The plasma flare slides down toward their horizon as the view overhead conforms to the changing orientation of their cabin. The crew feels heavier and heavier and, in near unison, they step into the warm fluid of the acceleration pool in the center of the common room. Buoyant, they can watch the show without discomfort.

Soon, the sun sets below their artificial horizon, their sky darkens and they can make out the major constellations. The rings now appear brilliant in the reflected light of the sun and the plasma flare. Glowing violet glints off shallow ripples that zip across the pool. "Five gravities," the starship says. Above, they watch the Southern Cross and Scorpius circle Alpha Centauri.

By their next evening they are farther from the Sun than the planet Mars. Only a few stray asteroids and an occasional comet ever venture into these parts. With nothing more to see, they float into their sleep modules. Body temperatures drop and life processes slow to a crawl.

By the third day, the starship is farther from the Sun than Jupiter; by the fourth, farther than Saturn; by the fifth, farther than Uranus and moving at almost 18 percent of lightspeed.

Back at the array, beam drivers throw particles faster and faster, drawing more and more power to do so—fifty terawatts, then eighty. After ten days, the particles leave at almost a quarter of the speed of light and take over two and a half days to reach the starship, now well into the Oort cloud.

At 47.4 days, the beam drivers turn off. The last particles fly out at nearly 95% of the speed of light as the beam drivers reach a peak power of 44,000 terawatts.

Weeks later, at a distance of two tenths of a light year, the crew awakes to watch the plasma torch fade as the last particles reach the starship. In universal time, they are 126 days older; by relative shipboard time, 96 days have elapsed, but biologically they have aged only ten days.

Their cabin reorients to its inward-pointing centrifugal mode as acceleration falls off. On one horizon lies a red-

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dened Sun, still dominating the sky and casting shadows from two tenths of a light year away. Near the opposite hemisphere lies Alpha Centauri, its rays blue-shifted from the starship's headlong pace. Ionized interstellar atoms drag lightly on their magnetic field as it deflects them away to harmlessness. Lasers flash at random intervals to deflect the occasional dust particle. If anything really big, say a millimeter across, were to come along, they would detect it soon enough to move out of its way with a brief puff of their auxiliary engines. But the odds are highly against that.

After refreshing their bodies in the low spin gravity and rubbernecking the universe for a while, the crew goes to sleep in the fluid pool again, shielded from cosmic radiation by the equivalent of two meters of water. They will sleep for most of the next two years, while, in the galaxy's frame of reference, four years will go by. The mass beam for their deceleration already creeps out from one of Alpha Centauri's kuperoids, a miniature Pluto-like world that circles both stars. For them, subjectively, it will be "next year at Alpha Centauri."

You've just taken a fictional ride on a mass beam rider, one of the most promising alternatives to rocket propulsion. Instead of pushing against its own exhaust, a beamrider is pushed by something else. This eliminates those pesky, exponential problems of mass ratio, exhaust velocity, and power-associated mass that lead an interstellar rocket to be either very slow, or be many (perhaps thousands) of times more massive at the start of its journey than at the end, even with nuclear energies available.

If the beam is made of photons, the beamrider is a light sail of the sort about which Bob Forward, among others, has written extensively.

But there is a significant advantage to using something that hits with a little more oomph than a photon. A photon must travel at the speed of light, and a reflected photon carries away almost as much energy as it started with. A massive particle's velocity, however, can be tuned so that reflection leaves it almost dead in space, having surrendered most of its kinetic energy to the starship. Such "mass beams" may consist of streams of atoms, molecules, clusters, or pellets; anything that has rest mass and can be reflected (no neutrino beams, please!).

Even the fictional "space drive" that uses the rest of the universe, somehow, as its reaction mass would not perform as well as a mass beam rider if the mass of the energy source to power the "space drive" must be carried on the starship. By $E = mc^2$, that energy has inertia, and so the "space drive" has a mass ratio problem similar to that of the rocket; it must lose mass to gain relative velocity.

Mass beams for interplanetary propulsion were originally reported by H. O. Ruppe in a 1948 paper in the *Journal of the British Interplanetary Society* (*JBIS*). In 1980, in a *JBIS* paper that got far less notice than it deserved, C. E. Singer independently proposed an interstellar propulsion scheme that contains most of the elements described in our fictional ride above.

In the late 1980's, Zubrin and Andrews did their study of using the solar wind to push magnetic sails that appeared in *JBIS* and in *Analog*. That seemed to open a floodgate as everyone thought: Why wait for the rather tenuous solar wind? Why not provide our own? There have been notable papers since by Giovanni Vulpetti and by Andrews. This author's appeared in *JBIS* in 1993. A conference on near-term robotic interstellar probes was held in 1995 and featured several related papers.

Most of the important ideas were covered, however, by Singer's 1980 paper

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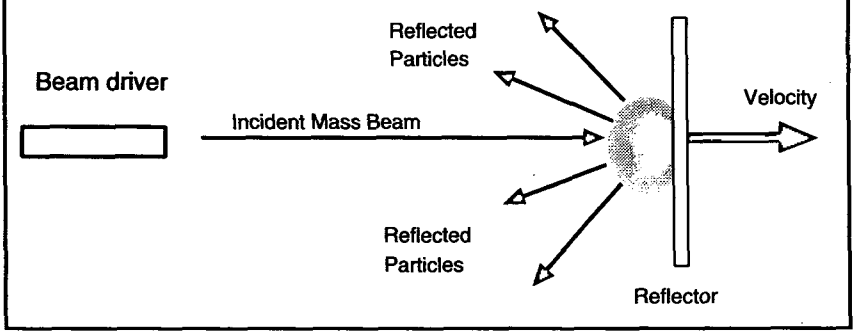
figure 1 Mass Beam Rider Concept



and Ruppe's comments to it. The following will describe the mass beam rider, address some of the common questions about it, discuss some trades and variations, and comment on some far future possibilities.

The system consists of a projector, the particles (or pellets, implying a somewhat larger size) and the reflector on the spacecraft, as sketched in figure 1. One can, of course, imagine many options for reflectors, mass particles, beam drivers and the space energy infrastructure to support them.

Our fictional mission assumed a constant acceleration of five gravities. Constant acceleration makes mission studies easier, yes, but that's probably what one wants to do anyway. For any particular reflector design, the more force it must withstand, the heavier it will be. So it makes sense to operate the reflector at its maximum design acceleration (with a reasonable margin of safety) for the entire acceleration period; one wants to get up to speed as quickly as possible, make the acceleration path as short as possible, and make efficient use of any mass that isn't payload.

Singer proposed magnetic mirrors as reflectors, and in our example, I chose a magnetic mirror with two loops as a reflector (figure 2). This was inspired partly by Andrews and Zubrin's magsail work, but also by work on magnetic nozzles for nuclear and antimatter pulse spacecraft which work with similar peak relative particle velocities.

To operate, a magnetic mirror requires the mass hitting it to have an electric charge. Most of the incoming mass must thus be converted into plasma as it approaches the starship; lasers, particle beams, or particle explosions could all accomplish this. If the impact plasma is dense enough once "ignited," it might even serve to ionize the incoming mass itself.

The outer loop essentially channels this incoming plasma to the inner loop, where most of the force is felt. Particles escape the field as they recombine and become neutral or follow field lines that merge with the galactic magnetic field.

Some of the plasma squirts forward along the axis of the current loops. This is not necessarily a bad thing; the starship will be preceded in space by a "guard plume" of hot gas which will tend to clear out and ionize the already tenuous interstellar medium in front of it, reducing drag and making less work for shielding systems.

The loops would be superconducting and probably will have to be cooled,

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but how much energy this will require is a question for future science and technology. High-temperature superconductors would be nice, but aren't required.

An auxiliary power source will be needed to maintain the field and ionize the mass beam, at least at the start. Ordinary fission systems would work, but by the time such spacecraft are built, some kind of compact nuclear fusion reactor might be available. Once underway, one might be able to bleed off some of the propulsion beam energy for additional power, if needed.

After the spacecraft reaches cruising velocity; the magnetic mirror will probably stay on. It is still needed to deflect relativistic "wind of passage" interstellar ions around or through the empty center of the spacecraft. Also, there's significant energy in the currents of those loops; quenching them could be a non-trivial exercise in heat rejection. Finally, the magnetic mirror is needed to decelerate at the starship's destination.

The deceleration particle stream needs to be projected with only enough velocity to get it deployed in time for the incoming starship to use it, so its energetics would be trivial in comparison to launching a starship. It would not necessarily need to be a "smart" stream; since one is not pushing the deceleration stream to relativistic velocities, one could use a brute mass approach and flood the general area with nearly stationary mass at the needed density—a bit like a cosmic runaway truck lane.

Of course, the first spacecraft to reach an uninhabited star system will not have a cooperating beam of particles coming out to meet it to help it slow down. First missions may be entirely automated, go more slowly than subsequent travelers, and consist mainly of systems to slow themselves down.

Slow-down systems in the literature

figure 2
Dual-Loop Magnetic Reflector

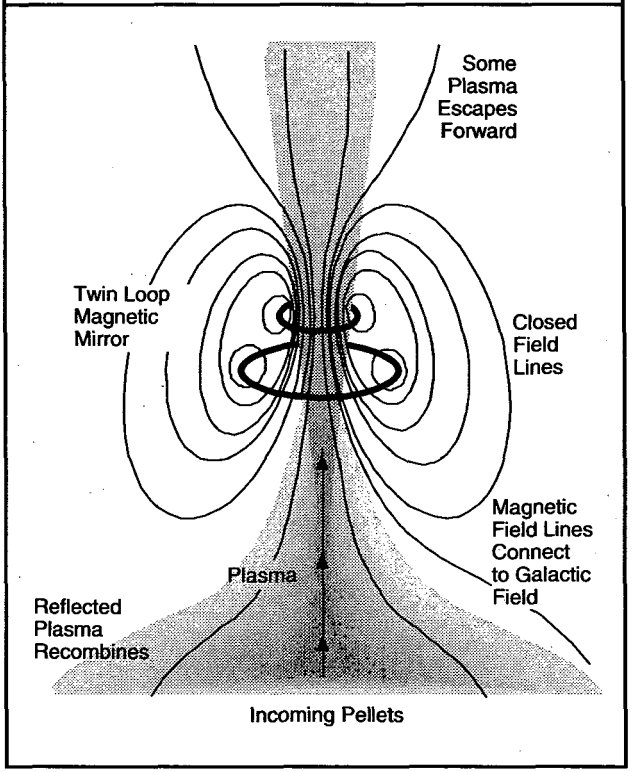

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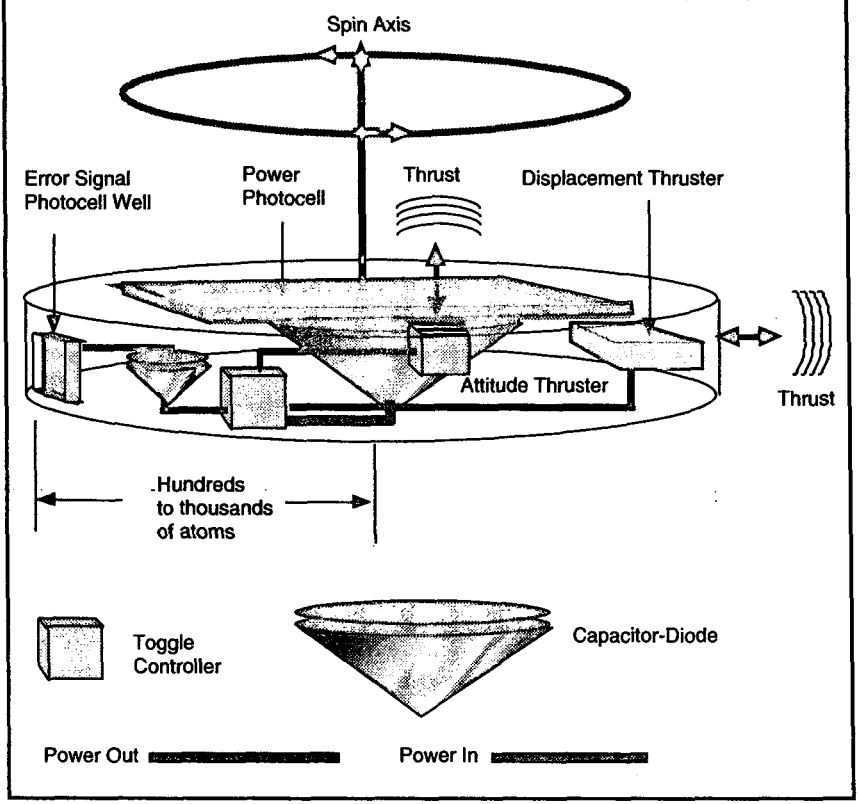
figure 3 "Fairy Dust" Particle Concept



include magnetic sails, Forward's giant retro mirrors that reflect photon beams focused all the way from the solar system, and various forms of nuclear rockets. Two or more of these systems might be combined; a magnetic sail might be used in the initial stages of deceleration, followed by a nuclear pulse system. Dr. Gerald Smith at Penn State has been working on an antiproton-ignited fission/fusion system that looks very much easier to do than most of the laser or particle-beam-ignited systems I've seen proposed.

However a first mission decelerates, once in the target planetary system, the vehicle would locate a suitable source of mass and energy and its replicators would start gathering materials and replicating. They would gather information, manufacture an infrastructure for subsequent exploration, and send out the slowdown path for the next set of visitors.

The major problem for a mass beam propulsion system is to hit the starship with momentum particles at distances that may approach a light-year at the end of the acceleration period. Even a hundred-meter-radius reflector is a target of only about 2×10^{-14} radians as viewed from a beam driver half a lightyear away; think of a three-millimeter ball bearing at the distance of the Sun from Earth.

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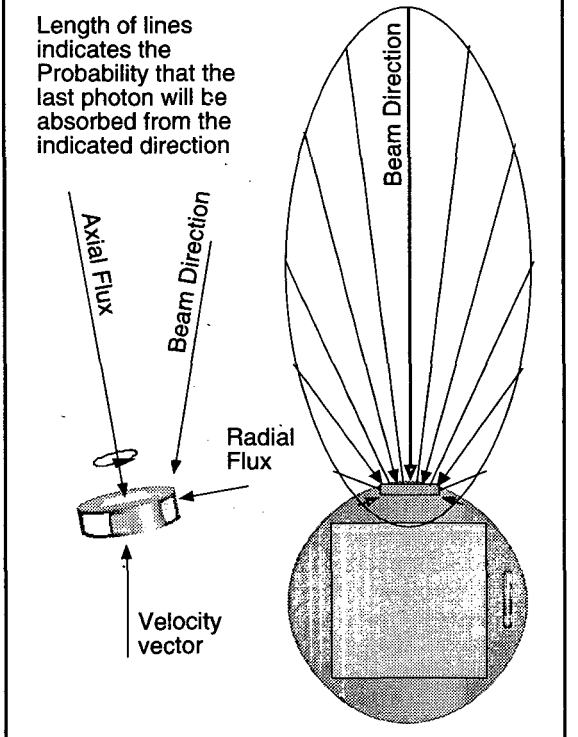
There are two types of particle trajectory errors to be considered for correction: a systematic error due to insufficiently accurate pointing of the beam driver, and random dispersion or spreading of the beam due to cross-beam velocity differences of individual particles, either initially, or caused by impacts with interstellar gas.

The first kind of error could be solved by the starship moving toward the beam center as the beam center drifts. But the end of the beam might be hard to chase; toward the end of the acceleration period the starship may be tenths of a light year from the projectors and, if beam pointing changes by microradians even on the scale of weeks, the beam center might move at several kilometers per second; too fast to chase with a reasonable on-board fuel supply. For an unregulated beam, pointing stability, as opposed to absolute accuracy, would be essential.

figure 4
Thust Vector Information for Momentum Particle Steering


Length of lines indicates the Probability that the last photon will be absorbed from the indicated direction
Beam Direction
Axial Flux
Beam Direction
Radial Flux
Velocity vector

The second kind of error is beam spreading, sometimes called the beam "temperature" since, in a frame of reference traveling along with the beam, the random velocities of the particles look like thermal expansion. Redirecting these velocities toward the beam center is called "beam cooling." Singer proposed to use lasers stationed along the acceleration path to push errant pellets back into line. This would work, but requires a lot of infrastructure at great distances from the sun.

Clearly, some in-route particle course correction will be required!

In our example, with a nod toward the milder forms of nanotechnology, the beam particles steer themselves to the spacecraft following a homing beacon. The maneuver capability of the beam particles would be limited—one wants them to hit the starship with some mass left!—but so would "thermal" dispersion velocities, particularly for more massive particles.

Figure 3 shows a qualitative approach

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to a self-steering particle. The particle would spin with its spin axis nominally pointed at spacecraft, which would provide a homing beacon. If all is well, the error sensors on the sides of the particle don't see the beacon, and it doesn't do anything.

But if the particle spin axis isn't pointed at the spacecraft, the error photocell is periodically exposed to beacon photons as the particle rotates. These charge a "leaky capacitor" connected to a "diode." The voltage on the error capacitor doesn't reach the diode trigger point unless the rate of photon absorption exceeds the leak rate. (These nano constructs need not be actual capacitors and diodes; anything that has the desired functionality will do.)

When a photon pushes the diode over a preset trigger level, the diode triggers a maneuver pulse (or a pulse train; this design is very much a work in progress!). What is important is that a single photon triggers this maneuver pulse. As shown in figure 4, this photon is most likely to be absorbed when the error detector is pointed in the direction of the beam centerline. With particle rotation rates on the order of several hundred revolutions per second, there will be a very large sample size, creating a high effective angular resolution for a system that has very poor angular resolution for individual photons.

The particle's reaction control subsystem would be powered by a capacitor attached to a frequency-tuned photocell at the front of the particle, which would absorb energy continuously from the homing beacon. The particle would be, in effect, a flying transistor, using light gathered by the large photocell to amplify the error detector's signal at the right time to energize the thrusters.

Photon thrusters would be ideal because they don't need reaction mass. But they are very weak. If photon thrusters can't provide enough velocity change (Δv), single atom ejectors might also be considered for maneuver thrusters, especially with "large" particles.

Both velocity and attitude thrusters are needed. By pulsing (on average) at the right point of the spin cycle, attitude thrusters tilt the particle spin axis toward the error signal. The Δv thruster would push the particle through its center of mass toward the error signal. This is a miniature version of the attitude and velocity control systems of many spin stabilized satellites. If the thrusters use visible light, a cloud of them might be seen to sparkle in homing beacon light like stars in a Kelly Freas painting or like Tinkerbell's fairy dust.

An error signal may be due either to attitude error or displacement from the beam. Which do we have the particle correct? Let's (1) assume an attitude error, correct that and set a toggle to Δv mode. If the error is in displacement, as the particle travels, the aspect angle will change and the error comes back. Now the particle does a Δv and sets the toggle to attitude. Since the Δv doesn't change spin axis orientation, the error signal is still there, and goes back to (1). Without making this too long, it appears that, with the right choice of maneuver size, a very simple sequence of alternating attitude and velocity maneuvers might eventually bring the particle back on a path to the beacon. If it works, the "computer" that alternates maneuver modes could be a simple one-bit flip flop, reset each time the propulsion capacitor discharges. This means the particle homing system could be extremely small.

How small is a future design trade. When I've described self-steering particles to nanotechnology people and asked how small they might be, I've gotten an estimate of around a million atoms. This is probably *too* small and I suspect a more reasonable esti-

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mate would be in the hundreds of millions.

The smaller the particles, the easier it will be to accelerate them to relativistic velocities and the easier it will be to steer them back on course. The larger they are, the less sensitive they will be to collisions with atoms of interstellar gas.

Because atomic nuclei are very small compared to atoms, impacting atoms would almost always pass completely through the particle, transferring only the momentum of their stripped electron shell. Whether this would be a survivable event in terms of momentum transfer is not clear. If it is, the particles should contain a passive nano-damping mechanism in case an impact with an interstellar gas atom causes precession. There are also very rare interstellar dust motes, but should a beam particle strike one of these, we can presume it lost from the beam entirely. One simply adds sufficient beam particles to make up for such losses.

Shape is also subject to trade analysis; figure 3 shows a "hockey puck" but an open ring might work better. The frontal area needs to be large to absorb as much beacon energy as possible, while the sides need to be thick enough to shadow the error detector so that it absorbs photons preferentially from the side. Perhaps this article will trigger some suggestions.

It would be useful if the bulk of the particle structure would be made of something fairly easy to turn into plasma, perhaps even endothermic enough to facilitate its own decomposition into an ionizable vapor as it enters the plasma behind the magnetic mirrors (but not before!).

Momentum particles will be much smaller and simpler than today's integrated circuits, but a similar kind of thing. They will all be identical and stamped out in the billions and billions by automated facilities. Once upon a time, someone who solved a particularly thorny computational problem by brute-force numerical integration with a distributed processor called his method "throwing microchips at the problem." He might be amused to see this taken literally in the case of interstellar propulsion.

Pellet acceleration is the area I've spent the least time with because there are many people already studying how to throw very small things very fast. Machines like the relativistic heavy ion accelerator at Brookhaven National Laboratory already exist, and experiments with ultra-high velocity cluster ion impacts have also been conducted.

Singer proposed a linear accelerator for his pellets that would be of planetary dimensions (say, 10,000 km, or 1/4 the circumference of the Earth) in length. These would be anchored to convenient asteroids. In the weightless vacuum of space and given space resources to use, the construction effort required for such accelerators would be much than their size implies and much, much less than required for, say, the superconducting supercollider on Earth.

But Singer's pellets were fairly large compared to the ones described above, and existing accelerator technology already copes with pulses of millions to billions of atomic mass units, albeit not in solid form and with much higher charge-to-mass ratios than "fairy" dust would be able to achieve. Still, for self-steering particles of less than a billion atomic mass units, it may be reasonable to think in terms of hundreds, rather than tens of thousands, of kilometers of beam line.

Using the beam drivers efficiently requires some thought. Obviously, if the beam drivers operated at a constant particle velocity, the process would be inefficient at the beginning of the journey, when reflected parti-

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cles would carry away most of their energy and also when the spacecraft velocity approaches the particle velocity and the particles provide very little push.

Ideally, the velocity of the particles would be chosen so that when they are reflected, their mass is left motionless (average residual velocity, momentum and kinetic energy = 0) in the frame of reference of their origin. Where has their kinetic energy gone? Into the starship. Thus, in principle, one could use every joule of the energy one gathers for propulsion to propel the starship.

But this doesn't make sense for the entire acceleration period. For one point, when one factors in some inefficiency in the reflection process, it turns out that the minimum power level for a given acceleration results in particle velocities less than would be needed for zero residual velocity.

Also, at the start of the journey, the power levels are small, so the cost of wasting power is small, and efficient mass flow rates would be inconveniently high. It makes sense to throw particles so that they achieve a velocity relative to the reflector (incident velocity) of several hundred kilometers per second initially and live with the inefficiency.

As one starts to approach particle velocities of a few percent of the speed of light, however, power and energy requirements become significant with respect to the ultimate mission requirements and efficiency becomes more important. Now it makes sense to increase incident particle velocity to reduce residual velocity to improve efficiency.

Once the incoming beam velocity is relativistic, however, a law of diminishing returns sets in. Residual beam energy, even if large in absolute terms, becomes small compared to incoming beam energy. Also, extremely fast incoming particles would stress the design of the magnetic mirror and add weight to the spacecraft. It turns out that, when the beam reaches relativistic velocities relative to the spacecraft, one can still achieve good efficiency with a reasonably mass-effective design by just staying with a constant incoming beam velocity. The velocity in the beam driver's frame of reference still increases, but only as starship velocity increases.

The exact velocities at which the rules for particle velocity change will depend on detailed engineering considerations, such as the efficiency of the reflector and the relative velocity of the mass beam it can handle.

Energy efficiency is such an issue because of the enormous energies needed for relativistic travel. While an optimum exhaust velocity rocket is surprisingly efficient, the best fusion exhaust velocity would be about 0.1 *c*, far below optimum for a 0.866 *c* starship. Antimatter rockets offer higher exhaust velocities and greater fuel efficiency, but need hundreds of times as much energy to make the antimatter as they get back from the annihilation reaction. By whatever means a starship achieves relativistic velocity, its kinetic energy is enormous compared to all previous human experience.

Relativistic velocity is best represented by the Lorenz factor, the classic "time dilation" and "mass increase" factor:

$\gamma = \sqrt{(1 / (1 - \beta^2))}$

Where "B" is the velocity as a fraction of the speed of light. At $\beta = 0.866\ c$, $\gamma = 2$.

The kinetic energy "K" of a starship of mass "m" is: $K = mc^2(\gamma - 1)$.

At a γ of two, the kinetic energy of a starship equals its rest mass energy, mc^2. A thousand-tonne starship moving at a γ of 2 would thus have a kinetic energy of 9×10^{22} joules, about a hundred times as much as the current total annual world non-food energy consumption, or about two million one-megaton nuclear weapons. To get this amount of

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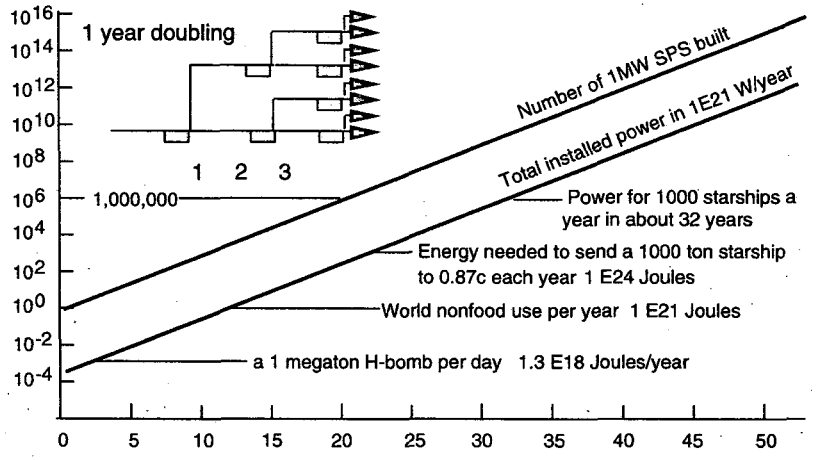
figure 5
Exponential Growth of Solar Power Stations


1 year doubling
1 2 3
Number of 1MW SPS built
Total installed power in 1E21 W/year
1,000,000
Power for 1000 starships a year in about 32 years
Energy needed to send a 1000 ton starship to 0.87c each year 1 E24 Joules
World nonfood use per year 1 E21 Joules
a 1 megaton H-bomb per day 1.3 E18 Joules/year
Number of years since machines started

energy into the starship, considering inevitable conversion and transportation inefficiencies, several times that much energy would need to be collected, let's say around 5 x 10^{23} joules. While this is an awe-inspiring number, it is not characteristic of mass beam propulsion; *it would be true of any starship of that mass moving at that velocity.* And because of the relative efficiency of the processes involved, mass-beam-driven spacecraft are likely to need less total energy to get a starship up to this speed at a reasonable acceleration than almost any other means.

Where will all the energy for interstellar travel come from? While a breakthrough in fusion power technology would make the moons and atmospheres of the giant planets look interesting, solar energy would seem to be the most straightforward choice. What is needed is a system of devices that, collectively, have the following properties: First, they can make all the pieces of themselves out of raw solar system materials (asteroids, lunar regolith, etc.) and, with minimal human supervision, assemble those pieces into a copies of themselves. At an average mass of 100 grams per square meter, the mass of a few medium-sized asteroids could provide the matter needed to make the collection area. Second, they can produce solar power stations and particle beam drivers. If such a system can reproduce itself and one solar power station each year, then the necessary energy collection hardware can be in place in a few decades, and, of course, used over and over again.

The engineering details of which conversion systems are most appropriate, how big the robots should be, and so on, can be left to the future. Today's solar power conversion systems will get

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better, simpler, and more efficient with time. Machines that make parts of machines are an increasingly relevant part of daily life in these times, as are (human scale) robotic assemblers.

Figure 5 shows the growth of installed solar power capacity with time, assuming each factory system reproduces itself and a 1 gigawatt (a U.S. billion watts) solar power array each year.

Obviously, a real system won't produce exactly one replica and exactly one gigawatt-class power station in exactly one year. Nor would it be fully autonomous—some human supervision will be needed—a figurative hand on the "off switch," for instance. But this calculation should give a good idea of the power self-sustaining exponential growth to get the energy needed for star flight.

The arrays could be placed at one or both of the Venus equilateral stations (Venus L4 or L5) where the solar constant is about twice what it is at Earth's orbit. A hundred thousand terawatts of solar arrays, a million meters across, would stretch about a hundred thousand kilometers (a little larger than the width of Jupiter) and would probably be visible as a bright tiny filament in Earth's sky. These threads in the sky would grow longer and longer as the capability to send more starships is added, eventually surpassing Venus in its brilliance in the Earth's sky.

The energy requirements for star travel are so high that it is difficult to see how it can happen without self-replicating systems. But these systems, applied in other ways, would have other profound implications for economics and social organization. When people talk about the "cost" of interstellar travel one needs to consider the implications of automated replicators and tens of thousands of terawatts. When humanity has what it needs to go to the stars, its concerns in many areas may be quite a bit different fromthose we face today.

Is it reasonable to think that we will be able to build such space-based self-replicating systems in the next 50 or 60 years? If so, we may be able to send our first relativistic starships out by the turn of the next century. Given the progress in life extension, some people alive now may even live to see it.

Many variants of the mass beam propulsion system are possible. To list a few:

Momentum transfer "pellets" could be heavy ions or cluster ions accelerated to relativistic speed, neutralized, then focused by a string of photon field lenses, spread out along the acceleration path. A photon field lens is basically a set of four tuned lasers pointing at the atomic beam path. The lasers are tuned just below a significant absorption frequency of the atoms; if the atoms stay on the beam, they don't absorb a photon. If they move toward the laser, the Doppler shift of their motion brings them into resonance with the laser and they get pushed back. While the neutral beam cooling infrastructure needed to see that the atoms/cluster hit the reflector would be complex, this might be a candidate for near-term systems in that it doesn't require anything that hasn't already been built, at least on a laboratory scale.

The pellets could be chemical or nuclear fuel, generating significant thrust from their explosions.

Particles large enough to have homing systems might also be also made with magnetic dipoles, providing a different kind of handle for accelerator fields to work with.

Also, radically different ideas, such as "snowflake" shaped particles designed to be accelerated by photons, need to be considered. I'd like to call these "star wispies" in homage to Robert Forward's "Star Wisp" study, wherein a microwave reflecting mesh is blasted to interstellar speeds at very high acceleration.

Initial experiments might be per-

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formed with simple neutral atom beam hardware designed for missile defense, though pointing and focusing would have to be improved by the addition of a down-beam focusing system.

The reflector could be a solid pusher plate, similar to that contemplated for "Orion"-type nuclear vehicles. This might be used in connection with pellets that would explode just before striking.

The reflector could be a gossamer parachute, again for use with pellets that would explode into a gas before being reflected.

In a very advanced system, the reflector could be a linear decelerator/accelerator. Pellets much smarter than the ones I've described would fly into the decelerator and be flung back out of the accelerator to serve as the deceleration path for the next accelerator/starship, whose deceleration would provide the energy and pellet stream to accelerate yet another starship. If this could be done with perfect efficiency, the traveling accelerators could bounce back and forth between stars trading energy with pellet streams, becoming, in effect, a "free" interstellar transportation system! Of course, in practice, there would be both energy and pellet losses to be made up.

In the far future, a very rugged magnetic mirror vehicle might even use the atmosphere of the target star itself to decelerate. A single loop solenoid field has more drag with its axis normal to the direction of travel than along the direction of travel, so the "angle of attack" of the field could be managed to provide negative lift to keep the spacecraft in the stellar atmosphere, curving around the surface of the star as it dumps its velocity. The magnetic field would have to be strong enough to keep relativistic plasma from touching the spacecraft: this is a fusion reactor, but inside out! Indeed, fusion reactions might occur in the shock wave generated by the passing vehicle.

Such a vehicle might need to be entirely solid to handle the deceleration. All its spaces could be filled with an incompressible fluid which could also be used for reaction mass once in the planetary system. From an initial $\gamma=2$ (0.866 c), the spacecraft would have to withstand over a million gravities for about ten seconds, during which it would cover about 700,000 km in the star's atmosphere. In the "small favors" department, heating from the star's radiation might not be that huge a problem in so short an encounter; the greatest concern would be on the way out, after the vehicle has slowed to mere planetary velocities of a hundred kilometers per second or so.

In the fullness of time, one could do more than just travel between local stars.

High-γ "Flying Dutchman" starships could roam the galaxy, deflected by beams from star to star instead of being decelerated, carrying data between civilizations in much larger chunks than could be managed by lasers or masers. Perhaps passengers could be picked up and delivered to such starships for a fraction of the energy that would be needed to accelerate/decelerate complete starships.

Taking a very long view, one could look on the energy collection system as the first step toward a "Dyson sphere," where a star is totally enclosed by a solar energy conversion system. From the standpoint of a Dyson sphere, even the energy requirements for interstellar travel are small; a star like the sun puts out 3.9 E26 watts. Imagine that we let our automated solar power factories run for forty years. If ten thousand kilometers wide, the array they could make would stretch across almost 30 degrees of Venus' orbit. It would intercept an impressive 3.75 millionths of the Sun's output and produce 1.75 E28 joules per year (about 20 million times what we produce on Earth today). This would be

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enough for some 38,000 flights a year up to a Lorentz factor of 2.

It would also be enough to send four thousand-tonne payloads a year up to a Lorentz factor of 40,000. Assuming one could make the appropriate beam projectors, that would get a ship to M31, the big galaxy in Andromeda, in about 50 years of shipboard time.

Another interesting thing that could be done would be a physics experiment in which four, say, ten-thousand-tonne spacecraft (unmanned of course) at a γ of, say, 4000 would be targeted to converge on a massive target of four high-density rods aligned in the direction of the impactors and set in an asteroid-sized sphere of a few dozen teratonnes mass. The center of a tetrahedron formed by Tau Ceti, 61 Cygni, Lalande 9352 and the Sun would be just about right for this experiment. Hopefully, mass to turn into power stations and beam projectors will be found around each star.

The conditions in the center of such an implosion would be incredible. The incoming mass would initially interpenetrate the target material, but pair production from close encounters would quickly fill up the space between nuclei with a "solid" zoo of massive particles. The oncoming mass would be relentless and there would be no time for anything to get out of the way. Rapidly, central pressure and density could increase to perhaps exceed even those in the center of the largest possible neutron star.

Beyond this qualitative description requires computer modeling of the sort I do not care to attempt, but if such an implosion could be designed to compress 7 teratonnes of the target mass into a sphere of 0.1 nanometer radius, the result would be an artificial black hole. This would be an object of many potential uses, one of which might be to make more black holes.

Mass beam propulsion could let us travel to the nearer stars on a time scale similar to that of early intercontinental ocean voyages. It is based on known physics and plausible extensions of known engineering that might be in place by the twenty-second century. While new science might be helpful, unobtainium is not needed, nor does it ignore fundamental issues of causality.

That is not to say that there isn't a lot of work to be done, nor that we won't be able to do much better with something else when the time comes, and I would be very happy if the starships of 2100 look as much like what I've described here as the Apollo project resembled Jules Verne's space gun.

But I think that by demonstrating that the question of interstellar travel can be decoupled from the concerns of rocketry, exhaust velocities, mass ratios, etc., the future of interstellar travel ceases to be a marginal concern limited to slow "generation ships" or some increasingly improbable total overthrow of relativity that could lead to FTL systems without causality violations.

We can now see how, by building small fractions of a Dyson sphere with automated labor and space materials, civilizations could send out thousands of starships a year at nearly the speed of light, create an interstellar culture that could spread through this and other galaxies, and, within a few centuries, possibly enter a new Promethean territory with experiments in general relativity on the macroscopic scale.

We may happen to be the first to do this. Or we may find others waiting for us.□

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**JBIS* is the *Journal of the British Interplanetary Society.*

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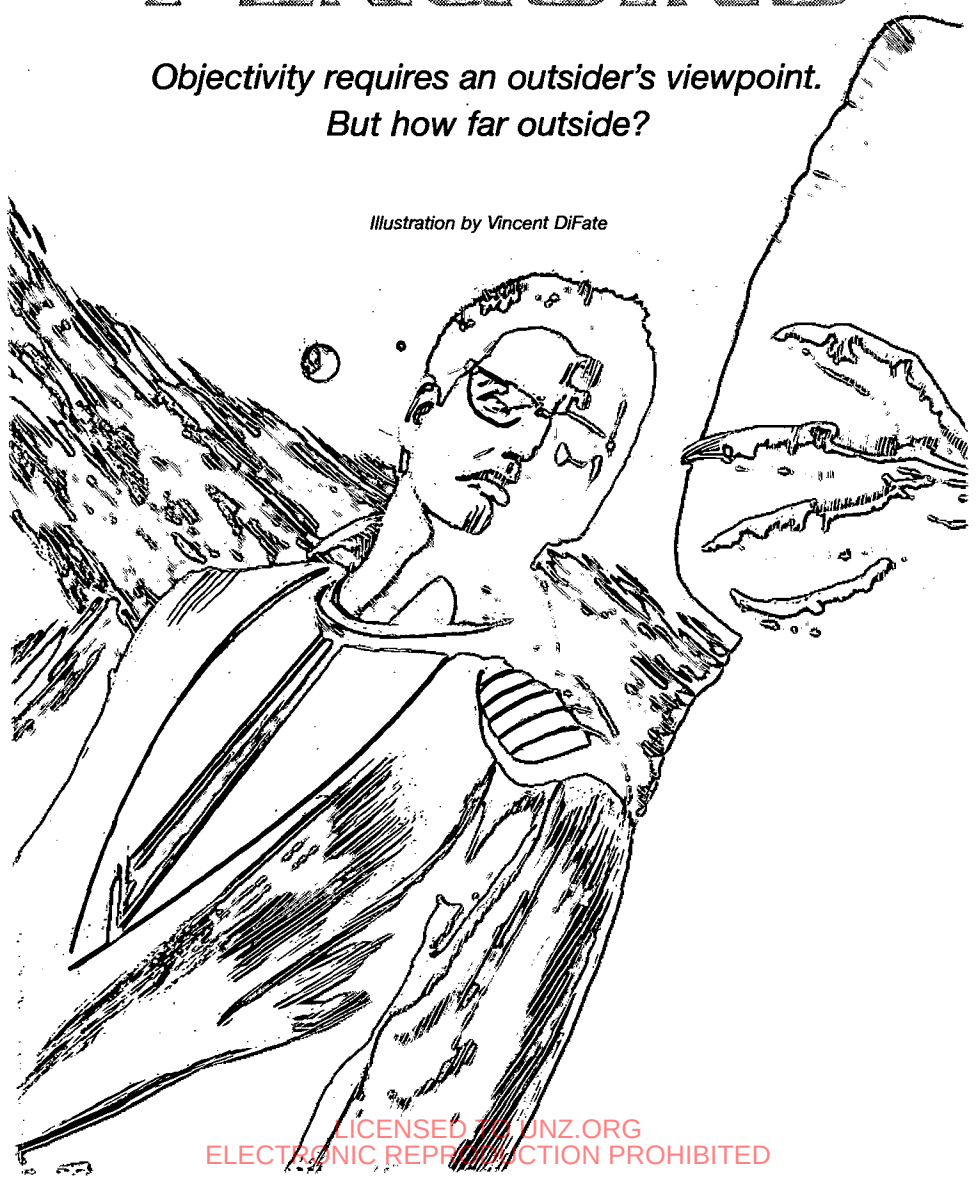
Joseph Manzione

EMPEROR PENGUINS

Objectivity requires an outsider's viewpoint. But how far outside?



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After midnight, John Renko fell asleep in front of his computer. The monitor glowed with muted oranges, yellows, and red. Children played in a meadow on an autumn afternoon, the shadows lengthening around their feet. It was a screen-saver program he especially liked.

The phone buzzed. Renko stirred and touched the speaker button. Timothy was calling.

He said: "Hi, Dad, Mom's asleep and I called to say I love you, I miss you, I can't wait till summer comes. Remember when we climbed Number Nine Mountain and I was so tired, but you said come on, you'll be glad when we get to the top? And the forest stretched out for miles below us and we couldn't see the edge? I liked that day."

Timothy talked for twenty minutes. Then he said: "I have to go. Mom's been *antagonistic*"—savoring the word, pronouncing each syllable—"today, and she'll get angry when she finds out I spent her money to call you. That's my new word: *antagonistic*. I miss you, Dad, I love you."

Renko rubbed the back of his neck. "I love you, too, Tim. I'll send you the money. You can give it to her."

"I'll call you again, Dad." A click and a dial-tone.

Renko laid his head down on the desk. After awhile he touched the keyboard and the children waved and disappeared. A legal brief appeared on the screen.

In the morning, Renko stood in the shower until his body stopped shaking. When he arrived at the office at seven-thirty, his associate was waiting with a cup of coffee in one hand, and a glass of grape juice in the other.

"Rough night?" she asked, and gave him the grape juice first.

"Tim called late," he replied. "And I didn't get much sleep."

She nodded, concerned.

"Give me a few minutes," he said, opening his door. "Then we'll go over the papers for the Nimrod hyper credit deal."

"Alicia Milton is trying to find you," she said quickly. She was worried about Renko. Her jaw tightened as she noticed the bruised skin around his eyes.

"Milton? What does she want?"

"The Aurigans want a meeting."

"What for? On the Nimrod thing?"

"No. Something else. Milton said it was important."

"All right."

The woman looked at Renko. "How is Tim?"

The aliens had arrived several years before. Appearing in the constellation Auriga, they were detected when their ships began terminal braking maneuvers well beyond the solar system, flooding the plane of the ecliptic with the arc-bright, blue-white light of quantum vacuum engines at full thrust. By the time they had crossed the orbit of Neptune they were promising benevolent relations and a commerce in technology and culture with anyone on Earth who would welcome them.

At the time, none of this had seemed important to Renko. His wife was divorcing him. She cleaned out the joint accounts, ran the credit cards past their limit, and took the children and disappeared into southern California. Renko found her, retained a lawyer, and demanded access to his son and daughter. She accused him of abusing her. ("That's pretty standard in this kind of dispute," the lawyer, a small, elderly woman with a Stanford degree and a big price tag, had told him.) She accused him of beating Tim and Annie. ("We hear that a lot, too," said the lawyer.) Things got really unpleasant when the children started asking why their mother was lying.

After a long and bitter fight, the best Renko could get was the fiction of joint custody. The children lived in an apartment in Yorba Linda during the school year. Annie kept asking if she could

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spend more time with her father. Her mother lost her temper and slapped her once or twice, but Annie kept trying. Timothy would wait until his mother was asleep, and call: "I miss you, Dad. Remember last summer?" He didn't talk about what happened when the monthly phone bills arrived.

Renko couldn't have cared less about the aliens. They found him anyway.

Infalco showed up at one of his lectures, several months after the Aurigans had opened their legation to the UN in New York. Renko, playing legal historian to a group of bored Boston University students, hadn't missed a beat. He spoke about the cultural implications of colonial law in the British Empire in the nineteenth century, finishing by comparing the legal and commercial dynamic of European imperialism to the trade agreements and cultural exchanges rapidly building up around the Aurigan contact. The analogy was crap, and Renko knew it. But he couldn't resist tossing a rhetorical bomb at the big alien sitting impassively at the doors to the lecture hall.

The alien was bipedal and thickly built, and wore an oversized Gucci suit. Black fur bunched out of the white shirt collar and up the back of its broad neck. The bare, miter-shaped head was sheathed in a slick, purple-and-black epidermis. The alien had on a Mickey Mouse tie that matched colors with its skin and small, yellow eyes.

As Renko dismissed the class and stepped off the podium, the alien rose to greet him. "I am Infalco. You are the law professor, John Renko."

"Sure."

"I have read your articles on the cultural contexts of commerce and international law."

"OK."

"Are you still practicing this law?"

"Some."

The alien suddenly reached out and flicked a piece of lint from Renko's hair. "We need a consultant. You can make a lot of money and we can show you interesting things."

Renko didn't care. So he said: "Why not?"

It was a frightening and fascinating and—most importantly for Renko—absorbing arrangement. While playing poker and drinking tequila one evening, Renko told some friends that the Aurigans had bought a few hundred tickets to the Superbowl by delivering a functioning gigawatt fusion power-plant to the United States Department of State. They had unloaded it from the back of a pickup truck. His friends thought he was joking. They laughed. "What's next?" they asked, "A Broadway play for a cure for cancer? Colonizing Mars for Burroughs's Barsoom novels?"

"Something like that," Renko said. He looked down at his hands. "But the downside is enormous. When you begin to eliminate parochialism, suffering, or death, the effects are complicated. The demographic factors, the strain on badly managed planetary resources or production, behavioral consequences, cultural consequences. I'm really a troubleshooter. I work on the legal and ethical implications and I help make the choices. It's hard."

His friends fell silent. They stared at his hands, too.

He picked up the phone. "Renko."

"John? Alicia Milton. Look, Infalco wants to meet with you. He's coming up to your office today."

"Here? In Portland?"

"You know how they are. They just drop in. I thought I'd warn you."

"You're not that considerate. Why's Infalco coming here?"

There was a pause. Milton said: "He wants a favor. Do you know Sefira?"

"Sure. The legation's second councilor. I've worked with him."

"He's got legal trouble."

"What, a traffic ticket? Or are we talking about commercial negotiations?"

"He has trouble back home. On his

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world. John . . . this is very important. Just listen to Infalco, and try to keep an open mind, OK?"

"Alicia, I can't imagine what this is all about."

"You've had some trouble in your personal life. We know that. The Aurigans do, too. Just be calm, OK? And listen to Infalco."

"What does my personal life have to do with this?"

"I have to go."

"Alicia, wait."

"Good-bye."

When Renko came back from lunch, Infalco was waiting in his office.

"I need an hour of your time, John. And your discretion."

Renko blinked. The alien wore the usual suit and tie. But Infalco tugged hard at the fur at his collar. Renko had never seen an Aurigan do that before.

"What's going on?"

"You have met Sefira."

"Yes."

"He has a problem. He wants your help."

Renko waited.

Infalco tugged harder at the fur on his neck. "Sefira and I are friends. I am acting on his behalf. I arrange things. It is a tradition. Do you understand?"

Renko didn't. He nodded anyway.

"Sefira's spouses are divorcing him on the grounds of incompatibility," Infalco said. "This is not uncommon in our society. However, Sefira wants his children. He has decided to contest for their custody. That is almost unheard of. No one of Sefira's gender—my gender—wins this kind of dispute. No one tries."

Renko swallowed. *Uh-oh.*

"Very few of my people will take Sefira's decision seriously," Infalco continued. "Very few people could imagine what he is trying to do. Do you understand? Sefira wants you to represent him."

Renko came out of his chair. "I am *not* a divorce lawyer!" He looked down. His hands were clenched into fists. He shoved them in his pockets. "This is absurd. You must have professionals who handle this kind of thing."

Infalco pulled at his fur again. "No one. Sefira needs someone who can *imagine* him taking care of his children. He will not find someone like this at home. He believes the only person who can help him is a human being who knows something about us and our culture. Someone like you."

Renko paced the room. "Infalco, it wouldn't be fair to Sefira or his children. I wouldn't know where to begin."

Sunlight fell on the alien's dark head. The skin glistened like metallic film. "No one knows where to begin. There are no good precedents and there is no modern law. And no rules beyond biology and ritual. Sefira is asking you to help him establish law. For his children's sake."

Sure. And Renko knew how it would go if he said no. Infalco would be gracious, assure him of a continued friendship, wish him a warm good-bye, and then the weight of the United Nations and the United States government would fall on his head. Alicia Milton had as much as told him so.

But Renko didn't want to say no.

"I like Sefira," he told Infalco.

Sefira was generous and friendly. Renko wondered what his children were like. What were Aurigan children like? No human being had ever seen one.

Renko knew that families were basic to Aurigan culture. In fact, the characteristics of Aurigan families formed the core of a messy dispute among human scholars and commentators, because Aurigan behavior and society were generally similar to the human kind. "There are Koreans and Hindus and German Protestants and Bushmen, and now there are Aurigans, and there is *still* nothing new under the sun!" one anthropologist had recently remarked in disgust. Even the cultural and psychological differences between the two

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species were easy to recognize and think about: a further argument for congruence between the species. Was it a happy coincidence? Or did it mean that all intelligent life in the universe followed a single, broad evolutionary and anthropological path, inventing analogous structures and rituals to handle similar issues, such as nurturing and protecting children? Did the nearly-identical environments of Earth and the Aurigan homeworld play an overwhelming part? Likewise, did the universe select for a certain range of intelligent behavior, because of its relatively narrow physical characteristics?

Put another way, could intelligent silicoid life in a supercold environment evolve a way of raising children, thinking about the meaning of existence, or practising science that was inconceivable to human beings? Or Aurigans? If silicoid life behaved inconceivably, however, was it life, in a useful sense of the word?

The arrival of the Aurigans offered no answers to these familiar questions, but it did lend them a new sense of urgency.

Superficially, the Aurigan family bore few likenesses to the human kind. Human behavioralists had compared it to a combat unit. The severity of the climate, terrain, and competition had forced the species to develop rigorous patterns of behavior and a marked differentiation between the sexes. There were four sexes, all of whom participated in the reproductive act. Beyond that, biology and culture mixed into gender, as each parent fulfilled specific, almost militant roles in nurturing or protecting their young. Infalco and Sefira were of the umpellatags—the large-framed, double-muscled, boney-headed outriders of the family—who found the way of migration across the hostile land, who intercepted the legions of predators and stood guard above the sleeping children.

Renko had met some of the litopegritags, the family hunters and gatherers, lithe and lean, with large, tough hands and long legs. They worked out of the legation. There were amprotags, long-fingered, triple-jointed mentors, and many of them conducted business for the legation, too. But there were no tagritags on Earth. The birth-mothers seemed to go nowhere without children.

Or the children went nowhere without their birth-mothers. In Aurigan culture, power was often compared to a tagritag's grasp on her young.

"To challenge a tagritag in matters of the child is to invite universal condemnation," Infalco explained. "It isn't done unless the birth-mother is a threat to her children."

Renko frowned. "It isn't even done then, is it? The depraved tagritag is an archetype of your classical literature. I've read the translation of the *Inconstant Parables*. Do you remember the one called *The Tragic Decision*? During the famine, the tagritag ate two of her children so that she could nurse her newborn. The umpellatag killed her before she could murder and eat the third child. The tribe killed the umpellatag and gave the newborn and the third child to the amprotag. As was customary, the amprotag murdered the newborn and the child and buried them with their birth-mother. The litopegritag, consumed by grief, killed the amprotag, and then killed himself."

Infalco stared through the window and across the gray Portland skyline toward Casco Bay. He didn't say anything.

"Sometimes an umpellatag is the better parent, Infalco. What do you do when that happens?"

"You see now why Sefira wants you," the alien replied. "Only a human being would have the temerity to quote *The Tragic Decision* in reference to a child-custody case."

Renko stopped pacing and forced himself to breathe. Tomorrow, Tim might call again. *I love you, Dad. I miss you.*

"I don't think I can do anything. But

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I'll meet with Sefira here, tomorrow, at ten."

"I have five children," Sefira said. "Until I came here, I took care of them. I made my children calm and happy. Sometimes the others made them anxious. They couldn't give the children a balance of love and discipline and security. Not like I could. It is that way in some families."

Renko listened while Sefira talked about his children and his family. Toward lunch, he suggested that they get out of the office and drive south along the coast.

"There's a stretch of bayshore and a village called Higgins Beach," he explained. "I walk it when I need to think."

The autumn sea was iron-colored, with highlights of lime and burnished gold. Heavy waves struck the beach and tore at the sand, and sluiced over the barnacle-encrusted rocks.

It was hard to tell, but Sefira seemed to be enjoying himself. He was particularly interested in the remains of a horseshoe crab.

"There is something like this at home. They are several meters across and they have large, leathery wings, where this one has the legs. They fly like this—" he turned the crab upside down—"so that the eyes face down and outward, scanning the ground for prey. They used to eat us, thousands of years ago. They'd plunge down and catch the children. We umpellatags could not stop them."

"Sefira, why did you leave your children to come here? You knew you wouldn't see them for a long time."

The alien did not answer. Renko shook his head. The case could fall apart on this point. Whatever passed for an Aurigan family court might believe that Sefira really did not value his children as much as he claimed to.

But Sefira said, "You do not understand. It is constraining to explain these things in your language. I did not have a choice. Umpellatags and litopegritags cannot specify their children as legitimate reasons to turn down career or public assignments. To do so would usurp the position of the tagritag and the amprotag, and violate standards of behavior. It could even be grounds for a divorce. My culture has defined a narrow role for me and I am captive to it."

It made sense to Renko. "You want to break out of that role," he said.

"I know that my children do not want to lose me. If it means that I must become something . . . *different*, then I will gladly do it. But my culture makes these choices nearly impossible for me."

Renko thought about it. He could certainly understand impossible choices that cultures often forced on individuals. "I'm going to take your case," he finally said. "I need a beer. Can you drink a beer? No? There's a market in the village. Let's go buy something and bring it down here, and drink it. I can't believe it. I'm going to take your case."

"Are you kidding me?" The judge, a man with a great, bushy, white beard, took off his glasses and stared hard at Renko. But he couldn't help himself. His gaze kept shifting toward the two aliens who stood at Renko's side.

"No." Renko tried to smile convincingly. "Under the terms of the Visitors' Agreement of 2001, and the extraterritoriality amendment passed last year, Aurigans who live the United States are subject to federal, state, and local law. This applies to criminal codes, property and contracts, and civil law, including family law—although it does not give the Aurigans certain political privileges. Mr. Sefira has lived in New York City for two years and falls under the parameters of the Uniform Divorce and Child Custody Jurisdiction Act. We maintain that he can file for a divorce and contest for the custody of his children in the State of New York."

The judge looked directly at Infalco.

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"Mr. Ambassador, does your government support Mr. Sefira's contention?"

"My government agrees that the laws of the United States apply to all of my people who live here," Infalco answered carefully. "If the law gives my brother the right to file for a divorce and settle the custody of his children, how can my government oppose it? I am here to offer the facilities of my legation to this court, in order to communicate with the persons named in the petition. They are sixteen parsecs away, you know."

Renko jumped in quickly. "The law requires timely notice to respondents who live outside the state. The ambassador is offering his legation's services so that all parties can comply with the law."

"I realize that," the judge replied irritably. "Mr. Renko, this court can't accept jurisdiction. According to your own documents, the children live with family members on . . . a distant planet. A New York court is an inconvenient forum for a custody decision, simply because the children live with their, ah, other parents. The matter should be brought to an Aurigan court."

"Your honor, jurisdiction is the crucial element of our argument. There is no court on the Aurigan homeworld that will provide Mr. Sefira with a forum to contend for custody. Children are assumed to be the property of their birthmothers and are routinely taken from their fathers without a discovery as to what is in their best interests. Mr. Sefira wants a forum, for his children's sake. He contends that since there can be no discovery on the Aurigan homeworld, the State of New York must provide one."

"Mr. Renko, I am not going to get involved in a cultural dispute with the Aurigans, and I don't think the law compels me to do so."

"With respect, your Honor, we contend that the law is pretty clear. Mr. Sefira's petition meets three important criteria of the Uniform Act. First, within the jurisdiction of this court there is substantial evidence concerning the children's welfare, care, and relationships—Mr. Sefira lives *here*, after all. Second, the other . . . uh, state . . . has declined to exercise jurisdiction by failing to provide a forum for custody. Third, a discovery on the custody issue is clearly in the best interests of the children. Since there will be no forum unless it is held in the jurisdiction where the father resides, it is in the children's best interests for this court to assume the responsibility. The law compels the court to act in the children's best interests, sir."

"Yes, yes, I see where you're going. I suppose you'll tell me that children are children, human or not. And you contend that the law can apply in this case, even though the Aurigan government is not party to the Uniform Act?"

"Well, there is language on international application. The general provisions of the act extend to foreign courts and decrees affecting residents of this jurisdiction. But Ambassador Infalco has already indicated his government's willingness to abide by our law."

The judge shook his head. "Mr. Renko, I know nothing about Aurigan families or children. I don't even know what acceptable Aurigan behavior is. Mr. Sefira could spit in my face, and I wouldn't know whether he was expressing contempt or respect for the court. If you bring this case before me, I won't know what to do with it."

A reasonable point. Renko didn't know how to answer. He decided to say nothing.

The judge said, "Approach the bench."

Renko tried to appear sympathetic. The judge didn't buy it. "Mr. Renko, you've brought a lot of *hardware* with you today—the Aurigan ambassador, a couple of UN directors, an assistant secretary of state, and an assistant attorney-general. If it wasn't for them, I'd throw you out of my court right now."

"I understand. That's why I brought them."

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"I'm going to throw you out, anyway, unless you tell me what you really want. You don't seriously expect me to preside over a divorce case for four Aurigan parents that you drag here from halfway across the galaxy, do you?"

"We want to make a case for primary or shared custody. Either here in New York, or on the Aurigan home world. So far, all we have is New York. You *could* help us to convince the Aurigan authorities to give Mr. Sefira the opportunity to contest for custody."

"Yes? How can I do that?"

"Well. . . ." Renko lowered his voice. "The Uniform Act allows the court to communicate with another court to determine if jurisdiction can be exercised there more appropriately and if a forum will be made available to all parties. The court can stay the original proceeding on the condition that a custody hearing goes forward in the more appropriate court. You could give the case to an Aurigan court, provided that it gives Mr. Sefira a proper forum for deciding on the custody of his children. Your obligation under the law would be discharged, and the children's interests would be served."

"You want me to communicate with a court on the Aurigan home world on one of those . . . special radios . . . they have at the legation? I see." The judge sat back. "Mr. Renko, you really don't have much of an argument. But I see what you're trying to do. Will it work?"

"I'm sure of it. Believe me, we have no intention of bringing this to a New York court unless we have to. And the Aurigans won't want us to."

"Do you think your client will get a fair hearing out there?"

"Uh . . . probably not. But I don't think he'd get a fair hearing in New York, either. After all, if he spits at us, we couldn't be sure of his meaning, could we?"

"You think I owe your client an apology? Maybe I do. Now step back, Mr. Renko."

"I hope you know what you're doing, John," Alicia Milton said. They stood in the hall outside of the court.

"I don't think a human court will have to hear this case, Alicia. The Aurigans are in a bad place. Their courts—and their government—can't let human beings decide on Aurigan law or social customs. But if they refuse to honor human law or accept a human advocate, it becomes a diplomatic problem, and they don't want that, either. They'll bring us back and give us a hearing."

"If they allow it, you'll be the first human being to visit the Aurigan homeworld, John."

"Huh. Hadn't thought of it like that."

He picked up the phone. "Renko."

"Hello, John. It's Maria Diaz. Listen, the bar association just got a weird request from the Aurigan legation. There's some kind of court on the Aurigan home planet—*Kanduakar*, they call it—that's asking for a certification of your credentials. Do you know anything about it?"

"Yes. Handle it like a transfer of credentials for a foreign court. Use the new UN standard. If you have any questions, contact the ambassador's staff at the legation."

"But John, the UN standard is a credential to practice law outside of the United States."

"Sure."

Diaz was silent for a moment. "But what does the Aurigan legation need with a credential to practice law outside. . . . John, you're kidding me."

"No."

"It's that custody petition you filed, isn't it? Everybody's talking about it."

"Well, I can't talk about it."

"Oh, of course. But I've heard about Aurigan child custody practices. It sounds pretty unequal. I guess that's an area where human beings have the high ground."

Renko didn't trust himself to answer that one. "Guess again," he said, after he had hung up the phone.

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Renko and Sefira were on the beach again. Both were bundled against the cold and the spray, the Aurigan in a gray-green blanket made of a thick, piled material. The wind gusted sporadically, and the sky spat a few large flakes of snow. The sand crunched under their feet.

"I heard from the Court of Kanduakar last night," Renko said. "They've agreed to hear the case. I'll represent you."

"Kanduakar is a criminal court," Sefira said. He seemed discouraged.

"I know that. You were still hoping that we'd be heard by your local court? Look, from what I can tell, they're a bunch of clerks. Kanduakar interprets law. It has even thrown out laws and framed new ones. That's what we want."

Sefira nodded listlessly.

Renko bit his lip. Alien or not, he thought he could sense what the Aurigan was feeling. He himself had lost faith in the law when a stranger in a goofy black robe had largely decided on the fate of his children and their relationship with him. It all seemed so careless, so perfunctory and cruel. He remembered how the color had drained from the courtroom; through the windows, the sky had bled to pale gray. He had known what the decision would be; the judge had opened her mouth and he had heard none of her words. Only Tim on the telephone that night: "It's not fair, Dad! I wanted to live with you! Why didn't you do something! Why can't you do anything!"

He's grieving, and we haven't even begun, Renko thought, looking at Sefira. *What kind of a world am I really up against here?* The sudden uncertainty made him feel sick in his gut. So arrogant to think that he might achieve something good in this situation, that his professionalism and his talents might win through. *I have a client and his children depend on me, and I don't know anything.*

Renko took a deep breath and tried to explain something that he barely understood himself. "The local authorities decided to bring you to Kanduakar on criminal charges, so that the court can hear your case. Your defense against the charges will also be your petition for custody of your children."

"So I am to be charged with abusing my children," Sefira said.

"Emotional abuse. Your spouses claim that your decision to contest for custody constitutes abusive behavior toward the family and the children. The local authorities chose to take the charge seriously. It's absurd, but it gives us a chance to present our case. It works out for everyone."

"I may lose my children and be imprisoned."

"No. The local authorities are not seeking a prison sentence. Your government is aware that there will be interest in the case here on Earth, because I am involved. Your government does not want anything to happen that will attract attention to certain uncomfortable differences between your culture and mine."

Sefira uttered a low, throaty snarl and turned away. "I wish I were as fortunate as you are, John. I cannot convince myself that I may be divorced and still be permitted to see my children."

Renko had heard enough of that from the Aurigans over the last couple of months. There was Tim on the telephone, and Annie, too, when she could wake up and sneak past her mother's bedroom. It was bad for *them*. In their world, calling Dad betrayed Mom.

He felt a surge of anger. "I'll tell you about something that happened a couple of years ago. It was the first summer I had my kids after my divorce. We were in a grocery store, and Annie slipped and cut her lip. A lot of blood. I tried to get her settled down so I could look at the cut. But there were three women in the aisle, and they came running over, and they snatched up Annie and took off. I was so surprised, I stood there say-

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ing, 'Wait a minute, wait a minute,' and one of the women said 'We'll take her to the restroom and get her cleaned up. We'll take care of it.' And I hesitated, thinking about it, and then I got really angry, because what they did was so goddam *condescending* and *invasive,* as though I couldn't take care of my own daughter because I was a *man*, and that's not what *men* do! Annie was screaming for me, and I thought, what if *I* had grabbed someone's kid and taken her off like that, would the cops arrest me, or would they just shoot first?"

Renko had to stop and catch his breath. "I ran to the door of the women's room and I banged on it and yelled that if they did not bring my daughter out to me, I'd come in and get her."

Sefira stood very still on the sand. The sides of his neck slowly throbbed. "What happened?"

"They brought her out. And looking at them, I knew I'd violated every assumption or ritual or convention that ever was. I'd kicked down the door to the inner sanctum and announced that I had a place there, too. I'd put the social imperative of the father on the same level as the biological imperative of mothers. I told some friends about it. They thought I'd overreacted. Maybe so, but I still had a point. I decided not to talk about it anymore, though. There's a lot of things I don't talk about."

The anger was melting into frustration, an old pattern. Nobody ever seemed to *get it.* "The same assumptions prevail here as on your world, Sefira. We mask it in law and rhetoric, and we give a little power or choice to fathers—just a little. We talk about how important fathers are to their children, but we make them assume the role of second-class-parents-of-convenience in marriage and in society, whether we admit to ourselves or not."

"But you are allowed to see your children, John."

Renko shook his head, frustration now evaporating into sadness. "I suppose I ought to be grateful that my kids are permitted to live with me for a few weeks every year. Joint custody's a nice fiction. We create the image of shared parenting for the sake of the law, not the children. The arrangement is nearly always unequal, almost never recognizes the importance of fathers to their children, and often encourages mothers to use the children to manipulate their fathers. Sure, my kids and I have it a little better than you and your kids. It's a question of degree, nothing more. Nothing will change until we redefine and transform the roles of women *and* men together, and put the child at the true center. The problem isn't that we've gone too far, it's that we haven't gone far enough."

"John," Sefira said, "your children get to see you. I would like it if my children could see me, too."

Renko rubbed his neck and stared despondently out across the ocean. The raw emotions were gone. He felt empty and foolish. "I'm making stupid speeches. You know who I despise the most, Sefira? The fathers who abandon their children or don't trust themselves as parents. They reinforce the stereotype. They make it hard for the rest of us."

Annie called that night. Renko sat at his computer, replying to a round of e-mail from the networks and news organizations, asking for interviews.

Annie came right to the point. "Dad, are you going away with the Aurigans?"

Renko swallowed hard. "Yes, I am, honey, for about a year."

But Annie had a surprise: "Tim and I want to go with you, Dad."

"That's probably not a good idea. It's not that I don't want you to come, but—"

"Dad, stop and listen for a minute, OK?"

"Well . . . sure."

"You said the Aurigans won't let their children live with their fathers at all when their parents get divorced. You

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should take us with you and show them what it's like when children live with their father. We'd sit behind you in the courtroom and we wouldn't do anything wrong. And then they'd see that we were right, wouldn't they?"

Renko sat back with his mouth open. It was completely out of the question. But it was *brilliant*, wasn't it? The trial would be broadcast across the Aurigan home world, with AKS-DUK faster-than-light feeds to the colonies; it was already the most publicized criminal proceeding to occur there in generations. And here on Earth, media representatives were spending serious money buying time on the Aurigan legation's AKS-DUK link, petitioning the Aurigan government and the Court of Kanduakar for a realtime feed for their own news programs. Imagine the impact of human children in the care of their father, sixteen parsecs from home, on a world where children were possessions of their mothers. With Annie and Tim present, the court would not only be rendering a judgement on the rights of children and their fathers in Aurigan society, but could be perceived as offering an opinion on human behavior, too—a factor that could influence Kanduakar and the Aurigan government profoundly.

Out of the question. What would it do to Annie and Tim, all the attention, an alien world? Well . . . who knew? Maybe nothing. Or maybe good things: a new and heightened perspective for a couple of bright kids, opportunities to learn and experience things no other human being ever had, a chance to help their father do something they all believed in. But to use his own children to influence a case?

But it was a *child-custody* case, with some very big ramifications.

Now Tim was on the phone with Annie, saying, "We can help you, Dad. We can help your client and his kids, too. Come on, OK? We can sit in the courtroom and look *healthy*, and *well-adjusted*."

Renko started to laugh. *They could pull it off, too.*

Why not? Would Annie and Tim be better off in a day-care center in Yorba Linda for a year? They would be safe, arrangements could be made to continue their education—what an education they could have on the Aurigan home-world!—and they would all share the experience for the rest of their lives. They wanted to be with him. And he wanted to be with them.

"What the hell is wrong with you, John?" their mother said, when he tried to talk with her about it that night. "I'm not going to allow them to go off with you, even if they want to. They're kids. What do they know about it?"

"More than you give them credit for, Karla," Renko said. "Just listen to them, OK?"

"I'm not letting them go with you."

"I've told you before that your opinion isn't the only one that matters in these kinds of decisions."

"We'll see about that."

"And you've told me that before, too," Renko said ruefully. "Look, just think about what they say."

"I don't have to listen, and I don't have to think. They're not going. If you want to fly off into outer space, that's your problem. But they are not going. They are children, and you are not going to take them away from their mother."

But it was not that simple. Renko had some power now, in this particular circumstance. He could explain what he wanted to Infalco, and the ambassador would take the matter to the United States government. No doubt, influence would be directed toward his former spouse. A case could be brought before a California court, and Renko would have allies. The question was, did he want to proceed in this manner? Nothing had stopped his ex-wife from doing so, when she had the power, but did he want to behave the same way?

It was hard, but Renko decided not to do it. A public fight wouldn't help his

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children. It wouldn't help his client, either.

But the children intervened before he could talk to them. Annie and Tim told their mother that, while they loved her and would return to her, they were going with their father. Tim threatened to call up "the TV news people" or a talk show. Annie said she would build a page on her school's server on the world wide web, explaining that the children of the man who was representing an Aurigan in a child-custody case were "prisoners on their own planet, in their own home." Going public would put the issue in a whole different light, Tim pointed out. Then the ruthless, calculating facade broke apart, and he burst into tears. His mother was shocked and angry, but she listened.

"You were going to take me to court anyway, weren't you, John?" she asked a few days later.

"No. But I thought about it."

"Tim and Annie tell me that this was their idea. Well, I'm not going to act like an ass about it."

"Telling you that they wanted to go with me was the most difficult thing they've ever had to do. We shouldn't have let it get to the point where they had to make a decision like that."

"It's not *my* fault. You're the one who's going. . . . Never mind. Look, John, I know you love them, and I know you wouldn't want to do this unless you were certain that nothing would happen to them."

"Of course not. I'm their father."

When Renko told Infalco that he was taking his children with him, the Aurigan sat silently for a moment. "You are going to turn my world inside out," he said.

Renko took Annie and Tim to the beach on the day before they were scheduled to leave. Sefira went with them. The sun was shining and the air was bitter cold. Ice, gray and green, rimed the rocks and edged the course of the surf over the sand. The sea was black, with highlights and wave-crests of polished silver.

Annie looked around and shivered. "It's like being on another planet, Dad!"

Sefira had been quiet and seemingly in awe of the children until that point. Now he ventured an uncertain facsimile of a human smile, awkwardly drawing his lips together to cover his massive, bright yellow incisors.

The passage out to the Aurigan home world was both boring and exciting. The ship was simply a small asteroid, braced and restructured with alloys, ceramics and regenerative biological materials. The living quarters consisted of large open spaces inside a spinning cylinder along the axis of the ship. Soil and plants filled these spaces, and water coursed among nickel and chondrite boulders and formed small pools. The Aurigans met and socialized there, and slept in elaborate tents clustered among thickets of small, bamboolike trees. They played complicated physical games on rolling, compacted terrain, matted with grasslike plants and small flowers. Orange-yellow strip-lighting—deeper than Earth's light—illuminated the spaces.

Most of the trip was spent "winding up" and "winding down," as Tim put it. The first part consisted of climbing out of the sun's gravity well at almost two gees acceleration—made tolerable by a careful combination of plasma-dampeners, metabolic regulators, and exercise—to a sparse region of the Oort Cloud. The second part involved a minute of extreme discomfort as the ship's generators deformed the spatial continuum, punched through an anomalous quantum barrier, and hurled the ship into the "shared stacks" that served as hyperbasal probability nodes on which the universe was anchored. Tim said it was like sucking your eyeballs back through your sinuses and swallowing them. Annie moaned something about turning inside out: "I saw what I had for

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breakfast, and it smiled at me! Aaaugh!" Sefira, who had become Annie's new best friend during the winding up, tried to reassure her that it was all a matter of sensory alignment and experience; things would go better on the way back.

The third part was best. When the ship emerged sixteen parsecs from Sol, they saw that Lambda Auriga was a beautiful system, a straw-colored star somewhat larger and more luminous than the sun, with a few planets and belts of planetesimals moving in comparably graceful orbits around a common hub. The fourth planet was situated well inside a broad life zone. A little more massive than Earth, the planet had many small, deep oceans and high, rugged mountain plateaus cleft by steep valleys. The tidal effects of a larger star and a substantial moon added heat to the core and gave the crust plasticity. It was an astonishing world, but perhaps a difficult one on which to build a durable, urban, technically-sophisticated civilization.

The most impressive feature of the Aurigan home world was artificial. Orbital elevators rose like vast spokes from the equatorial regions, culminating in the framework of an immense, unfinished ring around the planet. Close to the great elevators, the ring was largely complete, and glowed softly with hues of deep red and electric blue or purple. Beyond, the structure rapidly devolved into a lattice of white and black materials. The ship spiraled down toward one of the elevators, caught in beams of monochromatic light.

Matching orbits carefully beside a massive, hangarlike structure on the edge of the ring, the ship came to a relative rest. Umbilicals and tubes nudged up against airlocks built into the ship's rugged surface. Renko and his children and associates wriggled through a tube and entered the hangar, which turned out to be a huge hall. At center, a large group of Aurigans huddled quietly together. Renko, who knew better than to read his own emotions into alien behavior, nonetheless sensed their apprehension.

In front of the crowd stood an Aurigan of a kind that Renko had never seen before. Several small creatures arrayed themselves around it in a rough circle. One clutched at the Aurigan's dark purple robe. They appeared to be of a similar species, but rounded or unformed . . . *children?*

Renko examined the Aurigan as it stepped toward him. The robe was heavy, and came down to the floor. But the giveaway was the dark red epidermis on the aquiline face and neck, and the two long, tentacle-like tubes that extended down from below the strong jawline on either side of the head. Each ended in a fleshy, nipplelike structure. The tubes were loosely braided with bright bits of fabric, and hung down across the Aurigan's broad shoulders and chest.

A tagritag and her children.

There was a certain symmetry to this meeting, a mythical quality like what might be found in the *Inconstant Parables*: At the outset, an Aurigan birthmother and her children faced the bizarre human father and his own offspring. That it had been staged in this manner by the Aurigan authorities was obvious. But was the implicit message hostile or friendly? Renko braced himself as the tagritag halted in front of him. His grip on Annie and Tim tightened, and their eyes went wide. The tagritag noticed immediately.

"Mr. Renko," she rumbled, in a *basso profundo* voice lower than any umpellatag's, "I am the minister for justice for my government. You may call me Heliya. Please feel comfortable."

Renko nodded and started to compliment her on her skill with English, but then closed his mouth.

The Aurigan child—an umpellatag, by the look of him—had dropped his mother's robe and taken a step toward Annie. He extended a small, dark hand. The yel-

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low-and-purple nails glistened in the harsh, overhead light.

Annie looked at her father. She carried a stuffed yellow bird with bulging eyes, spread arms, ringed legs and orange feet—talking Big Bird, an old toy she would not part with. The umpellatag child reached for it. Renko couldn't think of what to do. So he smiled at her.

Annie took a deep breath, and handed Big Bird to the Aurigan child. He held it very tight and looked into its plastic eyes.

"That tickles," Big Bird announced. "Ha! Ha! Ha!"

The umpellatag dropped it and stepped back. "Let's be friends," Big Bird implored, face down on the floor.

Annie picked up the toy. She held it up to the Aurigan child and squeezed its hand. "OK, now! Let's count together! One. Two. Three. Four." Annie grinned and shrugged. She gave it back to the umpellatag. After some hesitation, he squeezed its hand, too.

"I love you!" Big Bird said. "Give me a hug."

Annie carried Big Bird around when she felt nervous or unhappy. Nobody could be upset with her when Big Bird was there. Renko used to sit on her bed and hold Big Bird up. It would talk, and he would make silly faces. Annie would fling herself on her father, and crush Big Bird between them.

The Aurigan child held Big Bird up to his mother. She reached out and squeezed the toy's hand.

"Let's keep playing!" Big Bird said.

The encounter between the humans and the Aurigans was being recorded. The images of Annie handing the toy to the Aurigan child was uplinked to communications centers on the planet's surface, and then onto the AKS-DUK network, reaching through the stacks to the four colonies and to Earth. It headlined every news account and network presentation among two species whose cultures depended so heavily on visual metaphors. The Aurigan child stood very close to Annie and squeezed Big Bird again. And Renko saw that he had won the first round. The tagritag Heliya saw it, too.

"You're my friend!" Big Bird stated. The crowd in the hall shuffled nervously.

Civilization was largely conducted in tents. Not a bad idea on a world where small earthquakes were relatively common, and storms were mild. The Court of Kanduakar sat in an enormous, multilevel yurt, a round, peaked structure made of woodlike beams and double walls of thick fabric. The rooms in the upper stories were made of polished planking suspended on stiff cables. Renko's temporary office swung slightly when he walked across the floor.

The city itself was at the bottom of a deep valley that was tented over with layers of fabric that were elastic and clear, supported by positive air pressure and webs and girders of a plasticlike material. Beneath this kilometers-long canopy, the buildings were insubstantial and temporary, often no more than big tents under a bigger tent. Industrial centers were underground, and commercial districts were scattered along the valley floor. Residential neighborhoods were carved out of the steep mountain sides.

Renko and his children spent their first week wandering around the city, accompanied by government guides who, thankfully, were not too intrusive. Renko decided that Aurigan society was familiar enough to human beings to be incredibly confusing—if it had been too different, the human mind would not have tried to mix and match metaphors and similes subconsciously to make sense of it, but would have "stood" apart. As it was, Renko was constantly tantalized by life in the city, but could reach no more than a cursory understanding of a few distinct processes or patterns. He couldn't understand the Aurigan economic system of *communal capitalism*—it seemed like a basic con-

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tradiction for individuals and corporations to compete to give "gifts" of knowledge or resources to one another, and he didn't know how such a system could hang together, accumulate investment capital, and profit everyone. But it did: there seemed to be no underclass on the Aurigan homeworld. Or perhaps the standard of living for the lowest percentile was so high that he—a mere barbarian standing inside the gates—could not recognize a lack of privilege when he saw it. The closest human analogue, he thought, was the "competitive community" of "gift-giving" in academic and government-corporate science, shared knowledge being the currency, and reputation and discovery being the prizes. But it was an incomplete and awkward comparison; there were underlying synergies in the Aurigan system that Renko could only sense darkly.

And there was the language problem that Sefira had alluded to earlier on Earth. Renko had carelessly dismissed it at the time. But here on the homeworld, he could not avoid the importance of empathy and shared experience. In spite of the similarities between the two species, Renko had difficulty thinking about Aurigan gender roles and relations, because the human perspective only shared a few basic similarities. He played word games with Sefira, inventing grammars and creating metaphors in a desperate attempt to find common definitions for divergent behaviors. Most of their attempts to reach down to a deeper context or build up a systematic understanding failed. Each time there was the sense of something looming through the fog ahead, some bright place just out of reach where everything would emerge with clarity; Renko's and Sefira's points of view were just that close.

And yet, the case had to be built on exactly this sort of clarity. Renko felt increasingly anxious. The trial was approaching, and he now understood that he might never know enough about these people to be sure of anything. What could he do?

Well, in spite of their technologies and conceits, the Aurigans could not be sure of him, either. The hearing could be turned into a negotiation over new law, and diplomacy was what Renko did best. The new law might be a composite of Aurigan and human perspectives, assumptions, and ideas—those that the two species shared or mutually discovered, at least—because, after all, Renko was human, and Sefira was looking for something vaguely like a human solution.

So perhaps a little reverse cultural imperialism was in order. Like many human societies, Aurigan civilization proclaimed that its standard of justice was universal, and involved what was best for children. Renko suspected that, like on Earth, justice had to more to do with what was convenient for the legal system. He decided to force the Aurigan courts to live up to their proclaimed standard by bringing the issue before the public, and giving it a "human spin" that could set a precedent for the trial at Kanduakar. So he filed a motion in the local court in the city where Sefira's children lived, asking that they be allowed regular unsupervised visits with their father until the trial began.

The local court, of course, rejected the motion.

Renko stood with Sefira on the street outside and read the verdict to a large crowd of journalists and onlookers. Then he said: "The court claims that unsupervised control by a father over his children without benefit of a marriage group is dangerous to the welfare of the children. The court also claims that common law traditions in Aurigan society make the practice illegal. I would like to point out that I have been living on your world for three months, and by the same common law practices, I am now a member of your society. I am also a father who exercises unsupervised control over my children. Therefore, I

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expect to be arrested by the authorities. If Sefira's children cannot visit with him, and these are the reasons why, then I demand to be arrested immediately."

And he turned to the representatives of the Aurigan government who had escorted him to the city. They looked very unhappy.

"Arrest me now!" Renko demanded. There was a minute of silence, and then the journalists began to shout questions.

"Please do not behave like that again," Heliya said. It was the following morning, and they were sitting in Renko's office.

"No promises," Renko replied.

The minister of justice gazed at him evenly. "It was a good strategy. You knew that we would not arrest you. However, Ambassador Infalco reports that your people on Earth were highly disturbed by the possibility, and are becoming more aware of certain differences between your culture and mine. This puts pressure on my government to accommodate the opinions and preferences of your people, because maintaining good relations is a high priority. And you have publicly drawn attention to legal inconsistencies regarding the status of alien visitors to my society. The fact that my government and the courts have chosen to ignore our laws in this instance, and to allow a human father to exercise solitary custody over his children, is creating controversy. But controversy and unusual behavior helps your case, of course, by giving Sefira's argument credibility it would otherwise have lacked."

"That's right." Renko glanced at the small video monitor on his desk. "Have you seen this?" he asked, swinging the monitor around. On the screen, a young umpellatag was speaking. "It's Sefira's oldest child. One of your news organizations got to him last night. He's asking why he can't see his father. He's talking about how human beings do things. It's clear he doesn't know very much about my people, but ask yourself how this is playing on Earth. And here."

Heliya was silent.

"You know Sefira's no danger to his son," Renko said softly. "You'd better find a way to give this kid what he wants. He doesn't sound like he's going to stop talking about it. And that'll cause more trouble."

The minister of justice rose to her feet. "I will see what can be done."

If the basic principle of law is universal, Renko thought, then I have less to worry about. The law may involve many issues, but it always comes down to deciding what is the most productive social relationship. The difference between using forensic physiology in the twenty-first century and trial by drowning in the twelfth is assumptive and evidentiary; that's all.

So there really shouldn't be much distinction between an Aurigan court and a human one, Renko told himself. Some procedural differences, of course. Nothing more.

Annie and Tim really liked the Court of Kanduakar. "Well, awright!" Tim said loudly, when the huge double doors opened and a fabulously rich orange-yellow light streamed out. The large room wasn't shaped by human traditions or competitive legal architecture. It didn't look like a carpeted arena, or a marble-and-wood sports stadium. It was a food court in a shopping mall. With food. Well, cool.

But then, everything was novel and appealing to the kids; the planet and its people were an enormous museum-and-amusement-park and Annie and Tim rolled and ricocheted through it as though it was their own backyard. They inhaled it through the nose and eyes and skin. They planted it alongside familiar memories of home, and nurtured it and let it germinate. They became farmers of a hybrid perspective, true diplomats of an age in which habitual platitudes and expectations had become inappropriate

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and dangerous. They didn't worry, like their father. They didn't try to make sense of Aurigan society, "sense" being an attempt to force it into conventional patterns. As their father had anticipated, they became the most influential "outsiders" in Aurigan history. The attention they got was sunshine and rain on the fields they had planted.

Annie and Tim sat at a table behind their father and Sefira, and stared up at the heavy yellow and electric blue fabrics billowing down from the high wooden rafters. They kicked at the gravel floor, and smiled at the court officers and functionaries who sat at tables around them. They wandered over to the enormous sideboard and filled bowls with crackers and cantaloupe and apple slices that had been provided for them, among various (and mostly unappealing and inedible) Aurigan foods. They wiped the cracker crumbs off their hands and convinced Sefira to give them high-fives for luck. "High nines!" Tim announced, counting all the digits involved.

But—*Thank God!* Renko thought—they knew enough to become quiet and attentive when the five justices came through a side door and sat down at a large table to one side of the courtroom. One of the justices, a tagritag, pulled her lips down over her bright red incisors and ventured a small grin at the children. The others tried to ignore them.

The trial started with a common meal and some social talk. The voices were pleasant and restrained, although Annie could not follow the conversations very well, even using the translations provided through the small earpieces the humans had been fitted with. Then one of the judges called the trial to order, and everybody turned their chairs around to face the middle of the room. The witnesses remained where they were. The prosecutors and the defense came to them. They brought them food and drink, and tried to make them feel comfortable. *Procedural differences!* Renko thought, as he hefted a carafe of ice water. *I feel like a waiter.* But he gave the prosecution's witness a big grin, and tried to keep the adversarial edge out of his voice.

As the trial continued, the children developed a different and broader perspective than their father. Annie compared the proceedings to an opera or a symphony, or a music video for a long, slow ballad. Often, she took out her earpiece so she could concentrate on the Aurigans' deep voices, now sing-song, as court ritual required. Each day, she slid into the same dream. She stopped listening to her father's words and his voice became a liquid melody, an aqueous tone sliding among the heavy, rugged refrains of the court and its officers. However friendly it was at the beginning of each day, the music soon grew furious. It sounded like the ocean crashing against the shoreline cliffs in Maine, a rowdy struggle between water and the permanence of the rock. "Rock never wins," Annie whispered to Tim, as she told him a little bit about this insight.

"Shut up, Annie," Tim whispered back.

The trial had a number of high points. Sefira's spouses were reserved, almost stonelike, except for the tagritag birthmother, who seemed very anxious. It was kind of sad. Sefira himself made a brave show, but Annie could see how desperate he was feeling. *Adults,* she thought. She liked Sefira a lot. But he was much too serious, like her father and mother. Sefira probably wouldn't win now, not in the simple way of the court, she whispered to Tim. But Sefira's wave would not be the last to strike at the shore-cliffs. The storm was closing in; you could tell just by looking at his spouses, look at their faces, Tim!

"Shut up, Annie," Tim whispered, and she punched him in the side and turned and smiled at the judges.

Sefira's children were really interesting. Annie's father convinced the court to allow the oldest two to testify, an ar-

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gument that lasted for two sessions. They waved at Sefira as they walked down the gravel aisle, those broad, sweeping, muscular arm movements that Aurigans make. They turned and waved at Annie and Tim, too. Annie gave them a slick salute and a thumbs-up like a fighter pilot in a movie, and they tried to imitate her. It had quite an effect on the court. Some of the judges stuck their own thumbs in the air, and then looked at each other and whispered.

When Sefira's children spoke, the court was completely silent. Only Annie's father had the presence of mind to ask any questions.

"Everybody was a little nervous," her father explained later that evening. "It's never been done before."

But Annie was feeling impatient. It was so *obvious*. "They said they wanted to live with their parents, including Sefira. They said they thought it was stupid that they couldn't see their father anymore. They wanted to know why nobody would listen to them. What *else* would they say?"

Her father sighed. "Annie, it's not that simple."

"Adults always say that when they don't know anything," she replied. "You, too, Dad."

Well, Annie thought, after the tagritag judge with the small smile and the red incisors had finished reciting the verdict. *We won, sort of.*

The courtroom was silent. Then there was an explosion of noise. Annie punched Tim in the side and mouthed *I told you so!*

The criminal charges had been dismissed. Custody of the children had been awarded to Sefira's spouses. No surprises. But for the children's sake, and "in deference to those who serve among peoples who do not sustain our common laws and practices," Sefira was granted the right to see his children frequently, and to participate in decisions affecting their lives. Annie's father looked stunned. Then he hopped up and down. Sefira sat with his arms extended out from his sides, staring at the gravel floor. Then he looked up and insisted that Annie and Tim give him another high-nine.

He spoke with Renko at the courtroom doors, before going off to meet his children. "John, they ruled that it was an exceptional case, but they will never hold the line on this. They associated the rights of fathers with the welfare of their children. Umpellatags and litopegritags will invoke the doctrine of the 'sake of the child' from now on, whether they serve in the diplomatic missions or not. Precedent works here, too!"

"You're right, a lot is going to change. The court must have known that. But why did they do it?"

"There were good reasons," said Heliya. She and Renko stood in line at the expansive zoo outside the city. There was a facility for exhibiting wildlife from Earth; many of the animals had only recently arrived. The day was warm and bright, and the yellow light reminded Renko that he was going home soon.

"We have been fighting a civil war here for a long time. No, not what you are thinking," Heliya said, glancing at him. "No open conflict, and not necessarily between the genders, either. It is between those who want to change things, and those who want conditions to remain the same. There is more going on here than your people realize."

"All right," Renko replied. "Tell me about it."

"We have become an interstellar civilization. We have contacted three other civilizations, including your own. And yet, substantial cultural changes haven't really occurred. Among my people there is a growing sense that things are not right. A lack of direction or purpose, maybe. Perhaps we have created a society that is stable because it resists social or intellectual or political innovation. It

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could be having a long-term effect on our science and technology, or our economy. We may be slowing down, becoming inflexible, less adaptive. And since we are no longer an isolated people, that may be dangerous."

Renko looked around. He was not sure which of the exhibits the line was forming for, but there were a lot of Aurigans in it. And, of course, he and Annie and Tim and Heliya and her children were centers of attention; people stood in little knots around them and whispered. "So you're telling me that Sefira's case has implications for this conflict you're describing. Sort of a focal point. And the Court of Kanduakar is dominated by judges who support change."

"No, the Court of Kanduakar is one of the most conservative institutions in our society."

"Then I don't understand."

"You were the sharp point on the halibura, the spearhead. The court's decision was a very big surrender."

The line was moving quickly now. The large doors to the oblong exhibition hall were open, and the air that gusted out was cold and dry. Inside, a harsh blue light glittered. Renko glanced back down along the line. There were several thousand Aurigans standing along the walkways, and more coming. What was so special about this exhibit?

"You're telling me that I've been used," he said.

"Yes. Did you think that you would be allowed to come here and put on this *show,* if certain powerful elements in my society had not found it useful? There are no causes here, only politics."

"That's pretty cynical."

She held a hand to her chest: the Aurigan shrug. "I brokered the surrender and instructed the Court of Kanduakar on its verdict. A temporary peace, but at the expense of major changes. Now I will look at my family in a different way."

"Which side are you on, Heliya?"

The minister stared at Renko. The sides of her neck throbbed. Renko had to remind himself that it didn't mean anything, she wasn't upset or angry.

"It was obvious to me," she said, "what would happen when we decided to communicate with human beings. Your entire civilization has been used as a weapon."

Before Renko could reply, they were through the doors and into the exhibit area, he and Heliya and the children.

They were swept by the crowd onto a high concrete balcony built out from a massive wall. Below was a field of ice strewn with gray and green rocks of many shapes and sizes, sloping down to a low cliff above shallow water. The air was cold and brilliant and blue. The effect of distance was taken up by the walls of the exhibit, three-dimensional video displays that seamlessly continued the water and ice and sky to the horizon.

"Penguins!" Tim cried.

It was a small rookery. Hundreds of big, stocky, black-and-white birds milled among the rocks and the snow. Some of them huddled together on the higher ice. Others lined the edge of the cliff and chattered and called. A few leaped into the water, long, graceful arcs that seemed to defy gravity. As Renko watched, one penguin made a stunning egress from the water, rocketing into the air, landing on its belly and sliding on the ice. The Aurigans shouted and stamped their feet appreciatively.

"I think these are emperor penguins," Tim announced.

"How would *you* know?" Annie asked, rolling her eyes and acting disgusted.

"From their orange and yellow headmarkings," Tim said serenely. Heliya's children watched this exchange intently. So did most of the adults nearby.

"Look, Dad," Tim said. "The ones jumping into the water are fishing. And the penguins back on the ice are taking care of the eggs. Look, you can see the eggs between their feet."

Something nagged at Renko, some-

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thing he had read about penguins once. . . .

Tim was ahead of him, as usual. "You know," he said, favoring Heliya with a roguish smile, "with emperor penguins, the mothers go off and hunt for food. The fathers stay with the colony and hatch the eggs and protect the little birds from predators and the cold. They're pretty good about that."

"I know, Tim," Heliya said.

Renko's mouth dropped open. He looked around. There were hundreds of Aurigans on the balcony, and thousands more outside. "You're kidding," he said. "They've all come here because of that?"

"It is a very popular exhibit," Heliya replied. "It opened during the trial. I thought you should see it. We do not have animals like these penguins."

Infalco had put the penguins at the top of the priority list just before Renko and his children had departed for the Aurigan homeworld. Nobody understood why. Penguins? It had become a joke at the UN: who could figure out the Aurigan mind?

The Aurigans gazed down at the penguins. Why not? They were witnessing their own future. Zoo prophecy. For Renko it was an epiphany, the confusion parting suddenly like a bank of roiling clouds in a fresh wind, a half-guessed landscape emerging into sunlight. The first broadcasts to Earth from the arriving Aurigan ships had promised technology for cultural exchange. Technology for culture? Political leaders, experts, even the business elite on Earth had wondered what the Aurigans were getting for their medical procedures, agricultural technologies and industrial designs, information systems, fusion reactors, scientific instruments, the techniques, constructs, and engineering standards that comprised one end of the commerce. Football tickets? *Casablanca?* (Said Rick, strolling toward the lights at the edge of the foggy runway: "Louie, I think this is the beginning of a beautiful friendship.") The rights to translations of Homer, Shakespeare, Mary Shelley, Borges, or Kawabata? Penguins? What was that all about?

The Aurigan agenda on Earth was bewildering—that is, assuming that influence and authority flowed in one direction only, from the powerful and technically-sophisticated, to those who were less so. Imperial Europe and the colonial domination of the Americas, Africa and Asia, recent American commercial and cultural hegemony among developing nations, the last five hundred years of human history—what if those hyper-simplistic models didn't apply to human-Aurigan relations? Technology for culture, what if influence really flowed in both directions? The leverage human beings could have—were having!—on Aurigan behavior. And no one on Earth had a clear idea about what was happening.

Powerful elements in Aurigan society were using that leverage for their own purposes. Cultural engineering, planned and systematic, applying the influence of an external civilization as a formidable set of social tools for change. Or, as Heliya had put it, a weapon.

"Parental cooperation among the four genders is the cohesive element in our civilization," Heliya told him. "The reason for its stability. Change the cohesive element, and who can know what will happen?"

Renko and his children returned to the orbital ring and boarded a ship for home the next day. The last thing Heliya said to Renko was, "Infalco owes you answers. Tell him I said so." She clasped his hand, a gesture that surprised and confused him, because she seemed to be imploring him to help.

Recently, the Aurigan legation had taken over the Chrysler Building in New York City. Renko was amused. Another example of dry Aurigan humor. The art-deco-cum-political-economy, thirties-style progressive decor—the metallic, Ming the Magnificent exterior and the

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sleek airplanes and aerodynamic tractors and trucks and factories and muscular, working-class Americans adorning the high walls and murals of the lobby—gave the legation a permanence and reality that it had lacked before. As though the Aurigans who crossed the tiled floor would not vanish one day like some modern mass-myth or media-induced hallucination, like the Roswell thing, or *The War of the Worlds* on depression-era radio. Standing by the polished brass-and-wood elevators, Infalco in his expensive gray suit articulated something both profound and absurd. The aliens really had landed, and they had come empty-handed. They hadn't brought the end of the world, and they hadn't brought enlightenment. They were looking for their own answers.

"We have a lot to talk about," Renko said.

"Of course," Infalco said, warmly. "How are your children?"

"They're famous. Along with the penguins. As you intended."

"I am glad. Wait now, John, until we get to my office and close the door. I want to talk with you very much."

And he proved willing to talk. He seemed different. Excited. Even a little reckless. They sat before the big windows and Renko clutched a glass of grape juice and watched the sun turn across the skies above the south Manhattan skyline. Infalco's small yellow eyes glittered in the light. Like amber.

"What do you know about the 'Asphalt People'?" he asked. "I believe the media here are calling them that."

Renko winced. "I've seen the legation reports, and I've spoken with some of your associates on your world. That's probably more than anyone else here knows. Why?"

"I had a short assignment there in 61 Cygni, years before I was posted to Earth. The Asphalt People are fascinating, of course, but very strange. We have had contact for hundreds of years. Beyond a few commercial transactions involving industrial chemistry, there has been little meaningful exchange. What can we say to discrete mounds of organic, electrified, tarlike carbon-silicates, clustered around volcanic vents at the bottom of a hydrocarbon sea? They have a civilization. They build things, and they have some mathematics. They have a set of creation myths that are difficult to understand, because the narratives start at the present and move outward in concentric circles to the beginning and the end. The stories are beautiful in form, impossible in content, and hint at a sense of time and evolution that we find very confusing. I fear we have little to say to the Asphalt People, and they have little to say to us."

Infalco paused and glanced out through the windows. "Even science and technology are problematic. Your own scientists and philosophers and historians realized the importance of perspective and paradigm, before we arrived. Think about what the Asphalt People's scientific paradigms must be like. Their astronomy consists of observing the upper regions of their own ocean. They call us a thing that means 'cold silt,' because we drift down through the blackness beyond the volcanic vents. Our description of the universe beyond 61 Cygni means nothing to them. In fact, because of what we have tried to tell them, they are convinced that they live on a rocky shell surrounding something we call a 'star.' Such misconceptions represent progress. But it is slow and frustrating."

Infalco raised his hands and indicated the city beyond the windows. The sun was slipping westward through a high, fine haze. "And that is my point. For two species to have a useful, productive, *timely* relationship, there has to be an extraordinary congruence between them. The sort of compatibility that exists between human beings and Aurigans. You are the only species we encountered with that kind of compatibility."

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Infalco looked at Renko. "It can be a powerful force."

"You're using that force to change your own society," Renko said. "You used *me*. Heliya warned me."

"Of course." Infalco leaned back in his chair. "Some time ago, there was a debate over whether to make contact with human beings. You were a threat to the status quo; everybody understood the concept of congruence and compatibility, and what it could mean in terms of changes in our society. Some welcomed these changes, many did not. It was an escalation of Heliya's 'civil war.' The controversy paralyzed my government. No decision was made. Some individuals, professional associations, and a couple of corporations put together the first expedition to Earth. Without official sanction. They opened contact, and then presented it to my government as a *fait accompli*. My government was forced to take over the project. I was a former minister of state at the time. I had a reputation. I was asked to come to Earth and put things in order. The fact that I was associated with the group that sent out the original expedition was not known until after my appointment."

Renko's mouth had dropped open. He closed it. "It sounds like something that might have happened here a hundred years ago," he sputtered. "Europeans among the natives. Like characters out of a Conrad novel."

"Yes, Conrad. Perhaps Rhodes in South Africa, or Gordon in China, or Americans on their western frontier. I have read some of those histories. A different agenda, though. We did not come here for material acquisition. Or to build an empire. We are here to promote cultural exchange. For the benefits it will give to both of our civilizations. And—honestly—the power it can give to my associates and I to make changes in our society. You saw that power. You helped us exercise it."

Renko stood up and faced Infalco. His hands were balled into fists. "Sefira's case was just a tool. Like me. And my *kids*."

The Aurigan stood up, too. "You already knew that," he replied in a soft, hissing voice. "You hoped to use Sefira's case to create changes, and you brought your children along partly for the same purposes. You just thought you knew more than you really did. Sefira wanted his children, and his motives were sincere. So are yours. And so are mine."

"What *are* your motives, Infalco? What do *you* get out of this?"

Infalco turned and gazed out through the windows. The sky was turning orange and pale pink; the light burnished the glossy black skin on his miterlike head with ambiguous highlights. There was a building tension in his body, and his hand tugged absently at the fur at his collar.

"Mine are the same as Sefira's," he said after a long time. "I had a family, too. Two children. I lost them. Years ago. I was stupid, really. . . ."

Infalco tugged harder at his fur. His mood had changed suddenly. Renko felt the hairs on the back of his own neck stand up.

"Family is the basic social unit," Infalco said, speaking slowly as though struggling to control himself. "Change the family, and the social structure above it comes undone. Easy to engineer, easy to shape into something new. The opportunities will present themselves. I was patient. When I helped organize the original expedition to Earth, I hoped for something like this. When I accepted the position here, I knew something would present itself. Eventually. So when Sefira came to me . . . it was the best opportunity I could imagine."

He stopped for a moment, and took a deep breath. "And it meant something to me, personally. It was like being able do something. About my own children."

Infalco abruptly turned and thrust out a hand toward Renko, palm upward. The bright yellow-and-purple nails were fully extended and the powerful, jointed

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fingers rippled, the edges of the nails striking each other, *click, click, click, KACK, click, click.* . . . The yellow eyes burned.

Renko took a step backward.

"When I lost my children, I swore that I would never forgive the people who took them away from me, I would *unhinge* their world, and remake it. A world that can permit fathers to be torn from their children, and then *parade* that fact as a virtue, cannot be allowed to continue! Just give me the opportunity. I have waited for that opportunity. That is what I *get* out of it! *It will all change!*"

Infalco lowered his hand and leaned against the window. "I have been devoured."

Renko, staring at the alien in shock, suddenly recognized himself.

The summer sun made the sand very warm. Renko shaded his eyes and looked down the beach at his children playing in the gray-green surf. Tomorrow they would fly back to Los Angeles. Renko lay down on the beach towel and closed his eyes.

Things were happening now, fast and furious; it was terrifying and exhilarating, all at once. Infalco cheerfully admitted that they were in a blind time, he no longer had control over the situation, he was riding the back of the tiger and Renko was riding there, too. A crisis was building on the Aurigan worlds and human beings—willing or not—were at the center. A dangerous place to be. Aurigan society looked like it was beginning to fly apart. Humans might have to broker a solution to the crisis, but the diplomacy was so complex, so difficult, and the consequences of failure were so frightening.

An image rose in Renko's mind: Timmie at the age of three, aiming at the toilet and pissing all over the wall and laughing hysterically, and Karla throwing up her hands and saying, girls *never* do that, dammit! And Renko thinking, Aw, how am I going to explain that to her, how's she going to understand Tim's needs and problems and point of view, and. . . .

Really, haven't we been practising diplomacy with aliens all of our lives?

Renko opened his eyes and sat up. I'll talk to Karla again, he told himself. Listen to what she has to say. Maybe we can work out a better arrangement for the kids.

It'll be tough, he thought, as he looked down the beach at Tim and Annie playing in the surf. *You know, the alien mind.* ■

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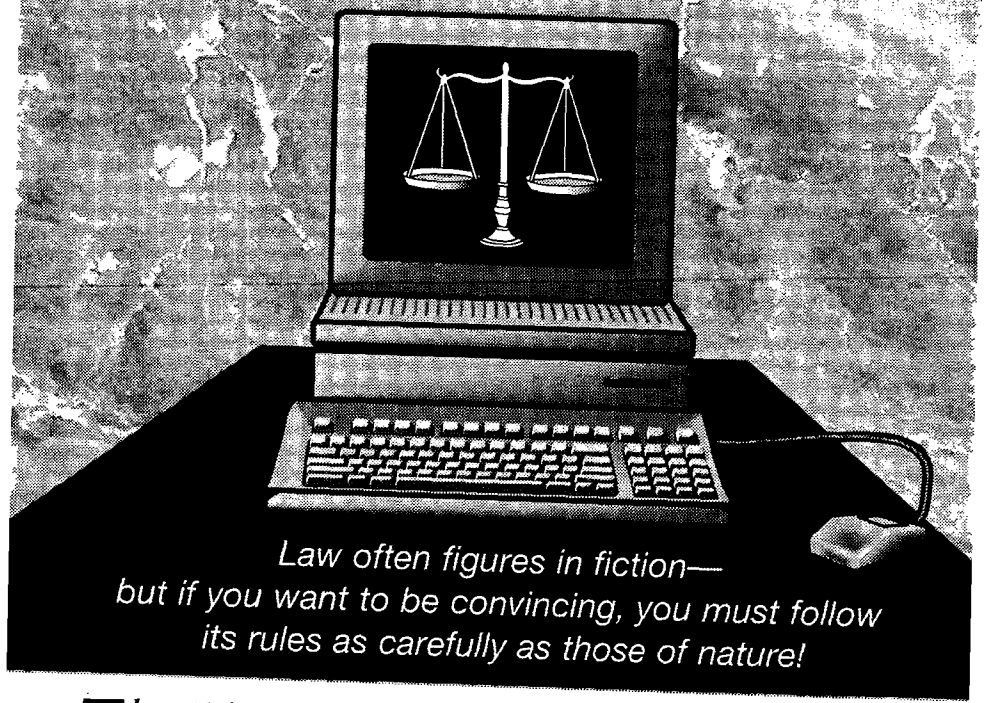
Joseph H. Delaney

SO, YOU WANT TO WRITE A LAW STORY?



Law often figures in fiction—
but if you want to be convincing, you must follow its rules as carefully as those of nature!

The captain stared in disbelief at the bridge's main screen. For a brief moment he was speechless, and when he found his voice it crackled. "That's got to be the enemy main fleet. Nothing else in space is that big. And they're heading right for us. Look at the intensity of that redshift. Sound battle stations."

The klaxon blared. Over this the captain yelled another order, this time to the pilot, "Drop to sublight." As an afterthought he turned to his science officer, "any chance they haven't spotted us yet?"

"Doubtful, Captain," the other replied, slightly annoyed to have been jolted out of his daydream. He was basically bored with shipboard duty, and as a distraction he let his mind wander in the vast wilderness of mathematics, where he pondered X and other quantities for days on end. "Now that we're sublight we glow like a small sun from all the phlogiston our hull soaked up."

Events quickly confirmed that

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opinion. The sound of explosions reverberating through the ether, thundering through space. The enemy was shooting; not just with high explosives, either, there were deathrays too.

"Geigers, captain! Zillions of them. My geiger counter's reading off scale. . . ."

Would you have read a story like that, even this far? Would Stan Schmidt have bought it in the first place?

Maybe, if you transmitted him back a century in time when less was known about such things. Maybe, if you knew that the story was being set in an alternate universe where things were subtly different from the one we know.

But if the author was deadpan and expected you to willingly suspend disbelief on his or her mere suggestion that this was science fiction? Hardly.

Analog is, after all, mainly dedicated to hard SF, except with respect to one lonesome discipline, law.

As long as I've been a subscriber, and that is upwards of fifty years, all *good Analog* law stories have been written by people who know their way around courtrooms, the rules of evidence and the constitutional boundaries of the system. Please note, I didn't say they were all lawyers. Some of the best were authored by court reporters, court clerks, legal secretaries and other people who make their living in or around courtrooms; people who have to know what they are doing in order to eat.

That appears to be the acid test, particularly as some otherwise pretty astute people with law degrees, but who are not advocates in the traditional sense have tumbled into the same pitfalls that so easily entangle lay people who try it.

It was the generally poor quality of law-themed stories that got me started writing science fiction some twenty years ago. I was determined to show Stan what a soundly researched law story should look like. It took some work, but eventually, with a lot of help from him, we came up with a story called "Brainchild," the first one he bought, which went on to become a Hugo finalist. I have several times since given permission to law school professors to use it in teaching their classes.

Whatever I can do, anybody can, including you, providing you approach it as you would any other technical problem and do your homework. A little later in this piece I will comment on the basic rules for success and furnish all the research sources you will ever need to put a plausible legal backbone into your story.

The basic reason why most people fail to write convincingly on legal subjects is that they assume that because law is not a physical science and its rules are not fixed, it is undisciplined. It is, in fact a very rigid, very conservative discipline with rules just a little more complex than quantum mechanics, but once you understand the prevailing version the rest is easy.

Again, please note this characterization—*the prevailing version.* This is important, and you must be mindful of it always, when you are writing your story.

Also, you must understand its evolutionary past.

Law is the world's second oldest profession, a universal institution. In its most rudimentary form it even predates species sapience. Every human society has it in some form, and every single one of these variants operate on rules as rigid and certain as nature's law of gravity. The only thing that's different is origin; man makes his own social regulators and man also make rules by which he can change his laws.

Order is necessary to group living. People must know what society allows them to do and what it forbids. Even total despots are not entirely above the law. Even they must operate under some restraints, however slight.

As human societies evolve they become more complex. More interactions occur between people as numbers increase, and these grow ever more com-

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plicated. At some point specialists take over from individuals in the administration of social regulation—lawyers, judges, bailiffs, etc.—and the common citizen loses touch with the system. He is inclined to regard it as arbitrary, or equate it with magic because its practitioners do things, sometimes things detrimental to his own interests, for reasons he no longer understands and which make sense only to their little clique. To the client, the joke is always on him and he quite understandably resents it.

Throughout the ages the masses have demonstrated this in various ways. Shakespeare wanted to kill all the lawyers. This has been tried, and found to be impractical. So has abolition of legal experts as a caste. Neither of these seemingly simple solutions or the myriad of variants that have been tried has ever worked because law—including lawyers, as I just pointed out—is a human essential. Administering it is a dirty, thankless job, but somebody's got to do it.

The fortunes of both lawyer and client respond to other natural laws. Supply and demand is one of the quality regulators. Too few lawyers spread too thin cannot do the job. Too many underfoot and some must lie, cheat and steal in order to subsist.

Forty years ago, when I began practice, the system was in relative balance and the profession was more favored and respected by the public. Law school was even harder to stay in than to get in. People rated law schools by how few freshman survived to graduation.

Lawyers could, and in fact had to, weed out cases lacking legal merit, giving courts correspondingly smaller caseloads. Judges could be thorough. Settlements were the rule, trials the exception.

Opening the doors so liberally, for all the real good it inarguably did for minorities, also did bad things to the profession. Discrimination that operated against individuals was replaced by discrimination against an entire class, which in its way may be as bad or worse. A century later we may know the true extent of the harm this caused.

Today, with a tenfold increase, the public is tripping over lawyers with every step it takes. Society has become litigious. Because there is not enough legitimate work to go around, made work is the rule. There are still many competent people but more often than not it is not the cream which rises to the top, it is the scum.

Now that you have some insight into why things are as they are you must learn how to to handle the legal equivalent of hardware—and this is where sloppy research really shows. I regret that space limitations do not permit exhaustive treatment—but, if you follow these basic rules religiously you can pull it off:

RULE ONE: *Pick your territorial jurisdiction.*

Define it if necessary but only to the extent this is critical to the story. There are many in the U.S. alone: fifty states plus eleven federal courts of appeals plus the U.S. District Courts, the supreme court and the various military courts, the tax court, and a whole zoo of administrative quasi-judicial tribunals. The latter are specialty forums with their own special and sometimes peculiar rules and practices. I will have more to say about these later; however, you should keep in mind that even within the conventional courts there are various divisions with the same menagerie of strange rules and practices.

For instance, federal district courts have subject-matter jurisdiction over such variants as bankruptcy, patents, and admiralty. In addition to this, both they and the state courts traditionally have differentiated between law cases and equity cases. Some states still even maintain separate law and equity courts just as medieval England did. These modern counterparts normally utilize

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only some of the old law-equity distinctions, but courts still sit at law or at equity depending on the subject matter of the cases before them; and the distinctions between legal and equitable actions, though subtle, are nevertheless important. For example, the distinction between a mandamus at law and a mandatory injunction at equity. Each has different rules and serves a different purpose. Unless you're a lawyer, never never *never* try to explain this in a story. Do it then only if it's crucial to the story.

The backbone of English jurisprudence (and also that of all the countries whose law is based on this, the identity of some of these might astound you) is the principle of *stare decisis*. It is the equivalent of Newton's *Principia*. Just as Newtonian mathematics holds the solar system together the system of precedents prevents chaos in the law.

Simply stated, stare decisis enables litigants, lawyers and courts to determine where they are in any given legal situation, what alternatives they can argue, and to predict with some chance of success the probable resolution of the case by a court. Overruling or deviating from a precedent is avoided whenever possible.

Generally speaking, no state (or any federal court, which *must* apply state law when deciding state questions, as in diversity of citizenship situations) can bind another to follow its law in an identical factual situation, although it is common practice for the courts of one state, when they find no local decisions on point, to look to neighboring jurisdictions, including England, that do have precedents for guidance in deciding cases. This is an example of a non-binding precedent. The Full Faith & Credit clause of the Constitution does, however, require all states to recognize the effect of each other's laws and judicial acts on individuals.

Binding precedents originate in appellate courts and are coincidental to their territorial jurisdiction. The kind most familiar to the average non-lawyer are those which resolve constitutional questions in the federal system. U.S. Supreme Court precedents are binding everywhere within U.S. Jurisdiction.

Theoretically, the courts themselves have no power to make law and merely construe statutes legislative bodies enact. The reality of this theory is debatable. A judicial interpretation can and sometimes does totally change the effects of a legislative act, e.g., *Brown v. Board of Education of Topeka* and *Roe v. Wade.*

On the other hand, it is a fact that in one fell swoop (or swell foop, to quote our esteemed editor) a legislature can also dictate what the law is anywhere within or without constitutional bounds. In practice this means that whatever it enacts remains the law until a court rules it unconstitutional.

U.S. Circuit Court Of Appeals precedents and those of state appellate courts normally prevail only with within the physical boundaries of the particular court's jurisdiction. (Yes, there are a few exceptions, but you'll have to look them up yourself).

For the author who utilizes the references I will provide a little later, avoiding jurisdictional pitfalls should be easy.

RULE 2: *Set the scene and tell the reader how you got to where the story starts.*

This is crucial, and it means more than just setting up a location, say, Maryland or Montana or Israel or Nigeria. It means identifying the court you're in, who your parties are and how they got there, what the issue before the court is going to be and who the advocates are. Be ultra-careful. A slipup here can destroy any hope that the reader will willingly suspend his/her disbelief.

Don't, for instance, refer to a court as a circuit court if the state has district courts. Don't call an attorney a district attorney when the state you're setting in has state's attorneys. Always remem-

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ber that state's attorneys and district attorneys are prosecutors employed by the state or one of its subdivisions and that, except in rare cases, a prosecutor is not involved in civil litigation between private parties. (Although he may litigate a public claim against a private party).

Setting the scene also means laying party and subject matter jurisdiction, (entirely different creatures than territorial jurisdiction). No court anywhere can budge a nanometer without it. Jurisdiction is always the first issue decided by a court. Bear in mind also that jurisdiction can be lost. (I remember a very fine story, extremely well written by a lawyer eminently capable in his specialty, that totally bombed for me because he kept on trying his case after the court had divested itself of jurisdiction to proceed).

RULE 3: ***Don't stick your neck out with gratuitous devices that do nothing for the story but point up your ignorance.*** (This is particularly important if you happen to be a lawyer).

Too often people inject terms like "depositions" or "briefs" (particularly amicus briefs) thinking this contributes to realism. It rarely does. Both devices have their uses in litigation but usually not in the way lay people expect. Depositions, for instance, are most useful to contradict witnesses whose testimony from the stand deviates from earlier testimony given in deposition. With very few and very narrow exceptions, deposition testimony is otherwise inadmissible.

Briefs (also called memoranda of law) are used a lot, but not as evidence. The only purpose of a brief is to make arguments and cite law, statutes and pertinent prior decisions of appellate courts to the judge, to persuade him/her the law is favorable to your client. This is why each side usually submits one. Amicus briefs from non-parties serve the same purpose but are normally rigidly regulated, and, when submission is permitted, they may be restricted in use by the court.

RULE 4: ***Watch your dialog.***

Remember, there's probably a jury listening and juries can consider only the lawfully admitted evidence. Juries are commonly removed during legal argument over admissibility of disputed or controversial evidence. Whispered consultations (approaching the bench) serve the same purpose.

If a jury or even an individual juror bases his verdict on something outside the lawful evidence there may be a prosecution and that verdict may be reversed.

Among the references I later cite you will find sources for the rules of evidence for many jurisdictions. Learn what's admissible and what isn't. Learn how to object and when to do it. Objections add force and drama, maybe enough to make the editor buy the story.

RULE 5: ***Watch who's talking***.

One of the better ways to lose the magic is to let just anybody talk promiscuously, or treat courtroom dialog like ordinary conversation. There is, of course, such conversation among the court, the court's employees, and the lawyers which is not evidence, and which the jury is instructed is not evidence.

However, during examination of witnesses dialog is normally confined to the examining advocate and the witness. Common exceptions are when an objection is raised, or when the court reporter, the other lawyer, or the judge does not hear or for some other mundane reasons (like the court reporter's stenotype runs out of paper—everything stops for reload).

Aside from voicing an objection, opposing counsel has no right to intervene. In real courtroom drama, he does not ask questions or argue with the wit-

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ness, opposing counsel or the court. Yet, with agonizing regularity such things have popped up in law stories, even in *Analog*. (In the past—but I hope not after this appears). Also, it is very important to get a ruling on any objections because an appellate court will not otherwise consider this a point of error preserved. If necessary, you must object on the record to the judge's failure to rule on your objection.

The one exception to the rule that only counsel examines a witness is when the judge does it. Some do, and some don't. It is generally considered a bad practice and most trial lawyers hate it, since it effectively deprives them of control of their case and not infrequently damaging testimony gets in that counsel would otherwise have kept out. On occasion it may be grounds for mistrial (this is where you start all over again with a brand new jury). It also may get the offended lawyer a reversal on appeal, if the judge denies him a mistrial and he then loses.

RULE 6: *Establish the characteristics of the court.*

This can be a powerful tool for an author. Contrary to popular notion and to egotistical belief among judges (particularly federal judges), getting elected or appointed, taking the oath of office and donning a judicial robe is not the equivalent of pouring legal knowledge into the judicial head.

Corruption, in all its many forms, is also a fact of life. There are many ways to ascend to the bench, not the least uncommon of which is for the judge to buy the office. These range from political influence, powerful friends in the state capitol or national government, to public apathy and correspondingly little or no opposition to his/her investment, the latter situation being endemic throughout the country.

Too frequently the best, most able, most successful lawyer disdains to sacrifice himself on the bench, so the mediocre lawyer fills in for him/her, enjoying the comfort and security of public employment/entrenched incumbency. Lack of competition provides little incentive to study and many such judges never crack a book, preferring to simply order all parties to file briefs while taking cases under advisement. Judicial opinions containing extensive verbatim recitations from the brief of the prevailing side are the rule, and most of these, again particularly in the federal system, (which has ample taxpayer money for such conveniences), are actually written by law clerks or secretaries, not by judges.

Sadly, there are more disquieting realities about judges that need some public daylight on them. Just as all judges are not intellectually and educationally equal, the proportion of judges who are dishonest, who are on the take, who harbor prejudices against parties or counsel, is far greater than the lay public realizes. (The classic example of *Catch 22* is a community in West Texas which got rid of an illiterate district judge only to have the governor appoint the town drunk to succeed him).

Corruption is rampant in courts at every level throughout this country. It is equally rampant among prosecutors and law enforcement people. You cannot write a realistic law story without taking this into account. The primary corrupting influence is the drug business. As Al Capone bought the justice system in Cook County, Illinois, back in the 1920's, the dope interests own contemporary justice. (They have more money than Al did, even accounting for inflation.)

Only the little guy, the so-called *"mule,"* ever sees the inside of a cell. Of the many I have defended there has not been a single one who did not tell me, in strict and privileged confidence, that when arrested he had at least twice the quantity he was charged with possessing (the rest got new owners).

Realistically—and realism is the

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lifeblood of an *Analog* story—there is a world of difference between what the law is and what finally emerges from the system.

If drama is your bag and you really like your protagonist squirming, just inject a little of this reality into the mix. There is no greater shock than to find that even with both law and facts in your favor your constitutional rights are worthless because you can't get the crooked regime to enforce them. Who knows, you might even do society some good with such a story.

RULE 7: *Assert your* human *right to control* your *universe.*

Scientist authors never hesitate to improvise. You can, and should roll your own law when necessary. Never abandon an otherwise good story because the law where you set your story doesn't quite fit.

There are lots of ways to get around a problem like that, the most useful of which is obfuscation. But—and again, this is crucial—it has to be good, solid, logical obfuscation or it won't wash. This is not difficult and we all do it when writing stories about embarrassments like the light-speed barrier.

Traditionally, lawyers have been very good at end runs. There is a reason, a device that you can also utilize, to do precisely what they do—if a lawyer doesn't like the law as it applies to his case, he argues that it should be changed. On rare occasions wish can become reality.

To you, the writer, what this means is that you are supreme in your setting so long as you satisfactorily explain how the law got to be as you declare it is.

The risk is that you can't only do one thing. You must be thorough, or some reader whose knowledge of the subject is better than your research will look up crucial parts of the actual existing law you didn't cover and shoot your story full of holes. (Lawyer/readers are not normally as vocal in *Brass Tacks* as scientists are, but believe me, they are out there, quietly gnashing their teeth over some of the things they read in these pages).

Just as you cannot simply abolish the light barrier and let it go at that, you cannot simply ignore basic legal premises. Everything must be adjusted to fit, or plausibility vanishes. Your system must balance just like a mathematical equation. You can maybe get away with saying a constitutional amendment passed and cleared the way for what you want your characters to do *if* you make certain this is not in conflict with something else you say. Also, all constitutional premises rely on and require implementation by additional legislation and construction by the courts. That may furnish you with additional wiggle room.

Because there already exists a potpourri of human law with many and diverse treatments of legal situations, this may be easier than you think, if you adapt a variant of actual, existing human jurisprudence.

Remember that once there was no settled body of law anywhere, that law migrates with populations. In the United States the process which evolved the law we know today is readily traceable.

Two principal systems, English common law and Franco/Spanish variations of civil law once prevailed in separate regions of the country. Today they are largely amalgamated by codification, by the states propensity to adopt procedural rules closely modeled after federal practice and by continual encroachment of federal influences on substantive state law.

Most people are astonished (but shouldn't be) how much of the western world bases its jurisprudence on the the English Common law which the British Empire imposed upon its colonies. (English barristers are quite at home in courtrooms as widely separated as Israel and Australia).

Good luck.■

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References: Law Research URLs

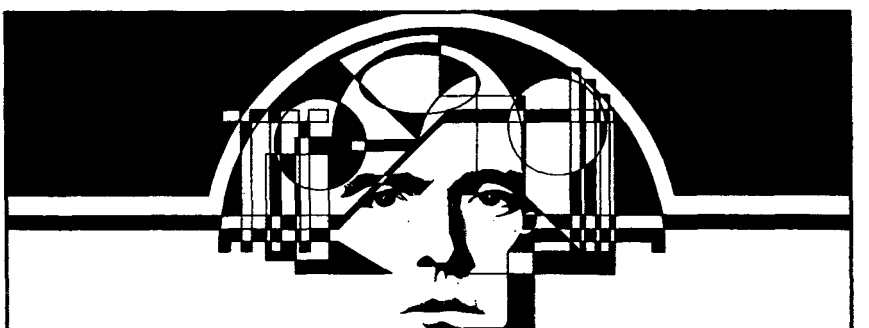
General Law Links Worldwide—*http://www.ih2000.net/ira/legal.htm*
This is really the only link you need, however, there follow some selected links I use often:

Washington University
General State Law Links and sources of information on the courts, law schools, etc. (There are a few backward states, like Illinois, which do not publish state statutes & court decisions on the web. Avoid setting stories in such places)
http://lawlib.wuacc.edu/washlaw/washlaw.html

U. S. House of Representatives—Federal law links and information sources
http://law.house.gov/1.htm

Library of Congress Home Page—Useful law links
http://lcweb.loc.gov/

Cornell University Law School— U.S. & State Codes, Supreme Court & Federal Appellate Court decisions, plus many useful links to related subjects
http://www.law.cornell.edu/topics/criminal.html



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Editor, **David Hartwell** talks about selecting work for his year's best anthology **June 22** **@9:00p.m. EST**

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Amy Bechtel

AS TIME GOES BY

You can know people—or monsters—quite a while and still keep learning new things about them. . . .

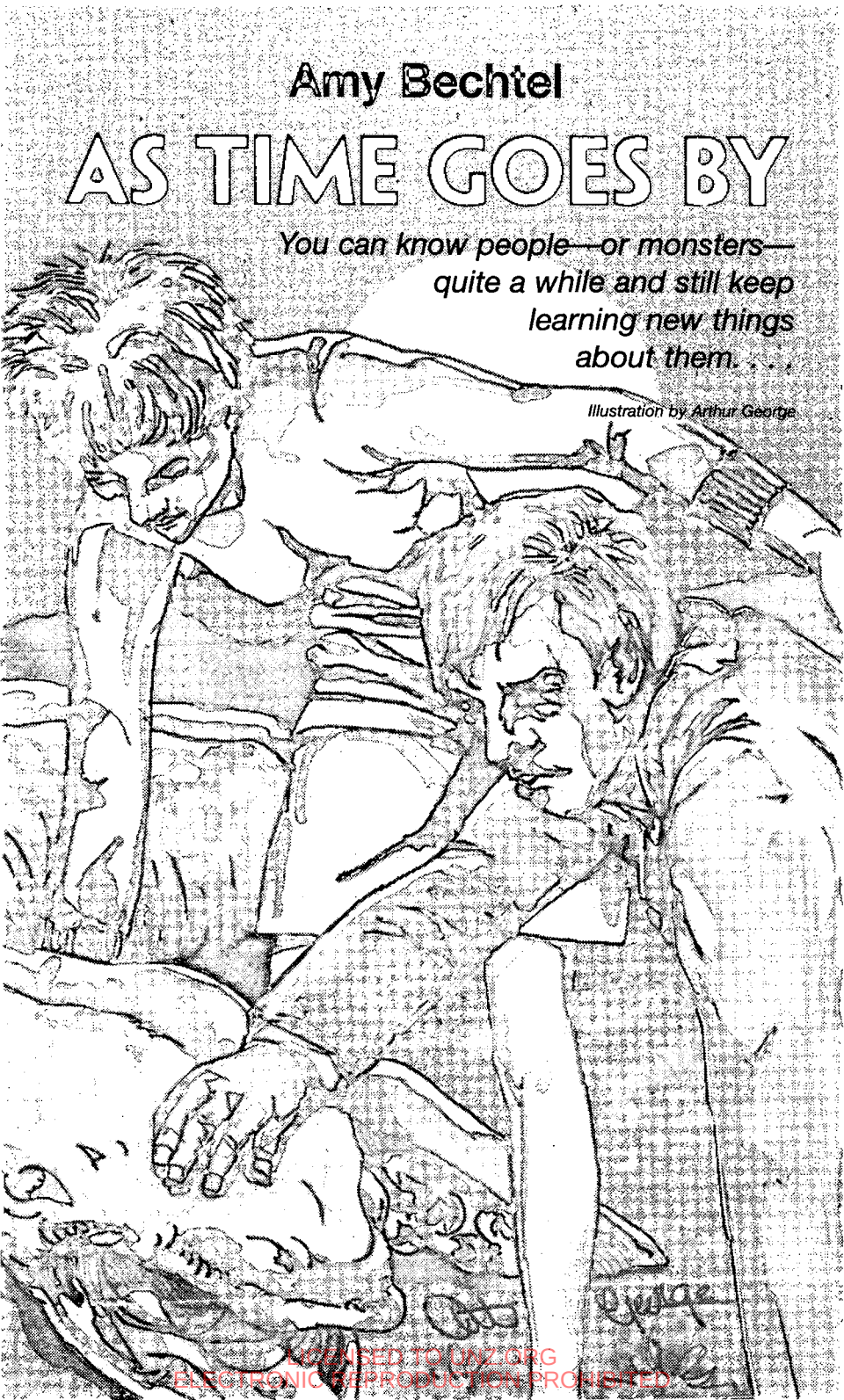

Illustration by Arthur George

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On Sunday morning, Howard Winston called me at my house. He was quite courteous about it, waiting till after nine A.M., but I'd been on veterinary emergency call all night and I'd just gotten to sleep. It had been a peculiar night. Usually I don't get many calls between midnight and eight A.M., but last night I'd lost count of the number of times the phone had dragged me from bed.

The first call had come at 2:11 A.M., from a Mr. Johnson. "I was playing tug-of-war with my puppy," he said, "and his *tooth* fell out!" I couldn't help but wonder why anyone would be playing tug-of war at two A.M., but I patiently explained that puppies have baby teeth, and that it is normal for them to fall out. Mr. Johnson said "Oh," and hung up.

The second call, from a Mrs. Butler, came at 3:29 A.M. "My cat's gone crazy!" Mrs. Butler said in a panicky voice. "She writhes around on the floor and yowls, and then she gets up and arches her back, and then she writhes around on the floor and yowls, and then she gets up and arches her back, and—" I managed to interrupt Mrs. Butler before she repeated the whole cycle of symptoms again, asked the cat's age (six months) and whether or not she'd been spayed (no.) Fairly patiently I explained that her cat was in heat and that it was normal for a cat in heat to behave in such a fashion. Mrs. Butler didn't seem inclined to believe me, and I ended up on the phone answering questions for a good twenty minutes, but finally she hung up.

At 4:22 A.M. a little girl named Brittany called to ask if cats could eat ice cream.

At 4:58 A.M. an elderly man called to ask how much a rabies shot would cost, and if there was a senior discount.

And the whole night was like that. So when the phone rang just after nine, I felt like a frazzled zombie, even though I hadn't had a single real emergency all night. I was fuzzy about whether the annoying ringing was the alarm clock or the phone (I couldn't get the alarm to turn off, so I tried the phone), and I wasn't entirely sure where I was.

"Desert Springs Animal Hospital," I mumbled. "Dr. Clayton speaking."

There was a long silence, and I stared at the phone, confused. Perhaps it had been the clock after all. Then I heard a hesitant voice say, "Uh, Michael? I thought I called your house."

I recognized Howard Winston's voice instantly, and a surge of adrenaline woke me up. Howard's pets tend to fill my nightmares: he does have some horses and cattle (I *like* working with horses and cattle) but he also has a vast collection of chameleons, tortoises, snakes, and other assorted reptiles. (I *hate* working with exotics. Especially snakes.) Worst of all, he has a family of young sea monsters living in secret in a vast underground pool on his desert ranch, hidden away from the world. I'm the only veterinarian who even knows they exist, which is not a happy thing for a vet who dislikes working with exotics.

"What is it, Howard?" I felt panicky, and my heart was pounding hard. "The sea monsters—"

"It's not the sea monsters."

"Oh." Relief washed through me, followed a second later by a new burst of panic. "Oh my God, your wedding's not today, is it? Am I supposed to be somewhere?" I was going to be Howard's best man, unless I'd already lost track of time and missed the ceremony.

"It's not the wedding. That's not for two more weeks."

"Oh. Good. What is it then?"

"It's a dog."

I considered this for a moment. Howard had sea monsters, reptiles, horses, and cattle. He didn't have a dog.

"You don't have a dog," I told him.

"I know."

"But you said you were calling about a dog."

"Yes." There was a long pause; then Howard said helpfully, "It's Lynda's mother's dog. I think I need to bring it in."

"Why, what's wrong?"

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Another pause, then Howard said, "Well, she's pregnant, see, and Lynda's mother's vet said that if she didn't have the puppy by today we had to take her in."

"How far along is the pregnancy?" I asked.

"Uh, I don't know. Hold on. I'll ask Lynda."

"Couldn't I just talk to Lynda?" I asked plaintively. Howard's fiancee Lynda had once been my receptionist, and she was knowledgeable about veterinary matters. It would be a lot easier to get useful information from Lynda than from Howard.

"She's got the flu," Howard said. "Laryngitis. Just a minute."

With agonizing slowness I got the information from Lynda via Howard: the dog was a hundred and twenty-five-pound mastiff, pregnant with only one pup, and she was overdue at sixty-seven days. It was definitely time for a C-section. Past time, really. I groaned and said, "Why didn't you call me sooner?"

"I don't know. I'll ask Lynda," Howard said obediently.

"Wait! Don't ask Lynda. Just bring the dog to the clinic. How soon can you be there?"

"I don't know," Howard said again. "There's a lot of snow."

"Snow?" There hadn't been any snow when I came home last night, but I hadn't looked outside since then. I leaned over to the window and pushed up a corner of the blinds; there was indeed a light dust of snow on the ground. In the mountains, where Howard lived, the snow would no doubt be much heavier.

"Snow. I guess an hour or so," Howard said.

"I'll meet you there," I said, and hung up. So much for my getting any sleep. Still, I didn't have to be at the clinic till 10:15, and with the snow it was likely that Howard would be late. I set my alarm for 9:55 and fell happily back into the pillows. I was almost asleep when it occurred to me that I really ought to go to the clinic and check my patients before getting into a C-section. Surgery on a big dog might take a while. On the other hand, my assistant Tegan was already at the clinic, taking care of the animals. She would have called me if there were any problems, and she hadn't, so that meant everything was fine. I could have my half-hour of sleep. I relaxed and curled up into the pillows and thought how lucky I'd been to find a dependable employee like Tegan. She was also bright, pretty (tattoos, spiked hair, and all) and marvelously fun to be with. Yes indeed, I'd been lucky to find her.

About then it occurred to me that Tegan was in the clinic *right now*, and the sooner I went in, the sooner I would see her.

Suddenly I wasn't sleepy any more.

When I pulled up to the clinic, the only vehicle in the lot was Tegan's battered little gray car. I wasn't sure what kind it was; the insignia had long since rusted off. Today it looked like the hood was strapped on with a bungee cord, and snowmelt was dripping through a hole in the roof. Tegan didn't seem inclined to pay much attention to auto maintenance, but fortunately for me she was absolutely reliable with animal care. I knew when I stepped into the clinic I'd find the place sparkling clean, the animals fed, the treatments completed and neatly marked off in the charts. I opened the back door and went in.

Everything looked fine, bright and clean, but there was a certain *smell*. A truly dreadful smell, actually, coming from the direction of the laundry room. I started down the hall, calling uncertainly, "Tegan?"

Tegan emerged from the storeroom with an armful of huge trash bags and a box of gloves. She was wearing black leggings and a purple tunic that clashed violently with the startling magenta of her hair, and as always she looked cheerful.

"Oh, hi, Michael. I didn't expect you

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so early. Say, is it OK if I use your rectal-palpation gloves?" She held up the box.

"Sure," I said, and then considered the question. "Uh, *why?*"

"The washing machine's broken."

"What? *Broken?* It can't be!"

I still didn't see the connection with the gloves, but the news was dreadful: a veterinary clinic cannot function without a washing machine. I followed Tegan into the laundry room and discovered a mountain-sized pile of disgustingly filthy towels and blankets. Well, that explained the smell. Tegan put on a pair of shoulder-length rectal-palpation gloves, held her breath, and began shoving the noxious heap into her garbage bags. That explained the gloves.

"That must be every towel and blanket we *have*," I said in dismay.

"Just about. There are a lot of boarders here this weekend, you know, and everyone was awfully messy last night."

I peered forlornly into the washing machine, wondering if it was repairable (well, certainly not on *Sunday*) or if I'd have to invest in a new one. "And here Howard's bringing in a dog for a C-section. Do you know how messy C-sections are?"

"No," Tegan said, interested. "I haven't seen one before. I didn't know that Professor Winston had a dog."

"Professor Winston? Oh, you mean Howard. No, he doesn't have a dog." Howard was Tegan's college poetry professor and he'd been the one to recommend Tegan for the job. I still couldn't really think of him as *Professor Winston*, though.

"He *doesn't* have a dog?"

"It's his mother-in-law's dog." I thought about that for a moment. "I mean, his future mother-in-law. Her dog."

"Oh. Will you want me to help with surgery?"

"Yes, please. I'm expecting him in about forty-five minutes."

"OK. I'll just run all this stuff to the laundromat and get it started."

"I'll, ah, I'll help you. I mean, it'll never all fit in your car. Just hang on while I take a quick look at the animals."

We couldn't fit all the laundry in my truck either (the vet box takes up the entire bed) so we split the bags between us and took both vehicles. It took two trips for us to haul all of our garbage bags from the parking lot to the big machines at the back of the laundromat.

"Look," Tegan said, pointing. "Those say they're triple-loaders. That sounds good, doesn't it?"

"OK." I had never even heard of a triple-loader, having had the good fortune to have avoided laundromats for the last ten years, but the machines did look enormous. We dumped our bags into four of the triple-loaders, and Tegan got out the detergent.

"How much soap do you suppose they take?" she asked.

"Gosh, I don't know. Maybe it says."

"Nope. There aren't any instructions. I guess you're supposed to know."

I shrugged. "Well, if it's a triple-loader, I suppose you use three times as much soap."

"OK." Tegan measured the soap, we shoved in quarters, and the four wash cycles started. We sat down together on a bench. A moment later a well-dressed woman carried an enormous fluffy comforter to the next triple-loader in line and started the cycle. Tegan nudged me. "That lady only put in one scoop of soap," she said.

"Maybe it's extra-concentrated soap," I suggested.

Tegan looked doubtful. We watched the machines for a time, in a companionable silence. Another woman brought in a fancy comforter, put it in a triple-loader machine, and added a single scoop of soap. I noticed that our machines were looking awfully—well—*soapy*.

"Uh oh," Tegan said, looking at the floor.

The drain in front of our washing ma-

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chines was filling with soap. A foamy mountain of soap bubbles oozed out of the drain, and as we watched it began to creep ominously across the floor.

"Isn't it time we got back to the clinic?" Tegan suggested.

"Ah, yes. It is, in fact. We have to set up surgery, you know."

We fled the laundromat and piled into my truck, making a hasty exit from the parking lot.

We had just finished setting up surgery when Howard came in the back door with a leash in his hand. Abruptly he lurched outside again, dragged by whatever was on the other end of the leash. I waited nervously. A moment later Howard appeared again, red in the face and puffing, with my patient in tow. Unhappily I looked at the dog. She was enormous and muscular, and she didn't look any happier than I was.

"Hello, Howard," I said with a sigh.

"Morning, Doc. Morning, Tegan," Howard said affably. "Sweet Pea is here for her C-section."

"Sweet Pea?" I said, disbelieving. Where in hell had this dog gotten a name like *Sweet Pea?* It looked like *Fang* would be a better name for her, or maybe *Killer*. Sweet Pea wrinkled her lip, bared her teeth, and snarled at me; apparently she was not pleased with my opinion of her name.

"Now, Sweet Pea, that's not nice," Howard admonished her.

"Ha-ha, she doesn't much like me, does she?" I said.

"No. She doesn't like anyone," Howard said. "Well, except for Lynda's mother."

"Does she like *you?*"

"Not really. She just sort of tolerates me."

I asked Tegan to try to befriend the dog, in the hopes that Sweet Pea preferred women (most dogs do, which is just my luck) but Sweet Pea apparently disliked all people regardless of gender. I tossed Howard an extra-large muzzle, and after a short but intense battle he managed to get it on.

I wasn't able to do a very good examination (Sweet Pea did not like to be touched) but eventually I determined that there was indeed a puppy inside her, and that there were no signs whatsoever of labor. Tegan was thrilled that she was indeed going to get to assist with a C-section. She watched attentively as I gave the grumbling dog an injection of morphine.

"Now what?" she asked.

"We wait for the morphine to take effect. Ten, fifteen minutes. It'll make her good and sleepy."

"Will she be under anesthesia?" Howard asked.

"Not really. It's more of a strong sedative. I'll use a local block. A general would anesthetize the puppy too, so I want to avoid that."

"Is it a difficult surgery?" he asked.

"No, it's usually pretty simple. Pop out the puppy, sew up the uterus, close the abdomen. Nothing to it."

Howard nodded solemnly. I had him take off the muzzle, and while we waited for Sweet Pea to get sedated I took the opportunity to write the morning's notes in my patients' charts. After fifteen minutes had passed I went out to the treatment room to look at Sweet Pea. She was standing up on the table, glaring at me and still growling.

"She hasn't calmed down yet," Howard said helpfully.

Howard put the muzzle back on (there was another brief but exciting battle) and I gave Sweet Pea another dose of morphine, jumping back hastily as she made a lunge for my face. We waited another twenty minutes, while I finished writing in charts, checked all the patients twice more, and started a dissection of the washing machine. Finally, with great reluctance, Sweet Pea lay down on the table, put her head on her paws, and went limp. She barely twitched as I shaved and scrubbed her belly and injected the local. I picked her

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up, staggering under her weight, and carried her into surgery.

We had just gotten her tied down on the table when Sweet Pea, ignoring her double dose of sedative, lurched against the ropes and tried to jump off the table.

"I give up," I panted, trying to hold her down. "She's getting gas. Tegan—"

Tegan hastily set up the anesthetic machine and clamped the oxygen mask over Sweet Pea's nose. Slowly the dog began to relax again, and Howard gave me a worried look. "Will the gas hurt the puppy?"

"Well, the puppy will be awfully sleepy. I really prefer having puppies wide awake when they're born, but as long as we pay close attention, it ought to be—"

Without a second's warning, Sweet Pea flung herself off the table, snapping two of the ropes. Tegan yelled in alarm, and I caught the dog halfway to the floor. She lurched in my arms, frenziedly fighting the remaining two ropes.

"Untie her!" I called frantically. "Untie her; she'll break her legs!"

Not to mention my back. I held her hundred and twenty-five pounds at a desperately awkward angle. As soon as Tegan got the ropes loose I collapsed with the dog to the floor. Tegan scrambled after us with the anesthetic mask and hoses, and tried to shove the mask back over Sweet Pea's nose, but the rubber seal was missing. Tegan looked around breathlessly and said, "Has anyone seen the rest of the oxygen mask?"

Eventually I found it (I'd somehow ended up sitting on it) and we spent the next thirty minutes getting Sweet Pea anesthetized, intubating her, rescrubbing her, and cleaning up the chaos in the surgery room. I was exhausted by the time we got the dog back on the surgery table, and I hadn't even started yet. Tegan looked at the clock with interest and said, "Do all C-sections take this long?" I glared at her and started to scrub.

The surgery itself, miraculously, went smoothly. Sweet Pea refrained from jumping off the table, and I delivered an enormous male puppy that kicked, squealed, and growled even as it came out of its sac.

"I thought you said the puppy would be sleepy," Howard said in surprise.

Apparently the puppy was immune to anesthesia, just as its mother was. I handed it to Tegan so she could suction it and rub it down. The pup's angry growling rose in volume. "Yikes!" Tegan yelped. "Thank God this thing hasn't got teeth!"

She hastily deposited the newborn in the puppy box, where it crawled blindly about and emitted rumbling snarls. I couldn't recall ever hearing a newborn puppy growl so ferociously before; I hoped I wouldn't be unfortunate enough to have to treat this one when it grew up. Surely Howard wouldn't want to keep it, would he?

Howard went over to peer into the box. "Oh, he's so cute!" he said. "I wonder if Lynda's mother would let us have him."

I'm sure a look of abject horror crossed my face, but Howard was too busy admiring the puppy to notice. I groaned and went back to work, suturing as fast as I could, just in case Sweet Pea decided to jump off the table again.

After sending Howard on his way and cleaning up the fearsome mess Sweet Pea had left behind, Tegan and I returned to the laundromat, this time with a garbage bag full of bloody surgical drapes and towels. We crept cautiously into the laundromat with our bloody bag, and peered along the back row of triple-loaders. The soapy residue on the floor appeared to be receding back into the drain, and our four washers had long since finished their cycles.

"Hey, cool, nobody dumped out our washers," Tegan said happily.

"I don't think anyone wanted to *touch* our laundry," I said. Tegan shrugged, upended the garbage bag

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over an empty washer, and carefully added a single scoop of soap. Then we checked the other washers.

"Ick," Tegan said. "Totally soapy. We'll have to run them through again to rinse them. How many more quarters do we have?"

I handed her all I had left, and went to get change. There was a line at the change machine, but it mysteriously dissipated as I approached, and a mother hastily pulled her toddler away from me as I got my quarters. I glanced down; sure enough there was a large smear of blood on my shirt and a streak of greenish birth fluid behind my elbow. Oh well, at least I hadn't had to wait in line for the quarters.

I settled down on the bench by Tegan, thinking what a nice conversation we could have while the washers did their work, and my beeper went off. "Oh damn," I said, and while I was looking for the pay phone it went off again.

The first caller was an elderly woman, concerned because there were two dogs stuck together in her front yard. I attempted to tactfully explain that the dogs were having sex, and that due to the swelling of certain glands it would probably be some time before they separated, but it was hard to be discreet on that topic; she hung up on me. The second caller was a man who wanted to know if it was true that equine emasculators made a good sex toy; cringing a bit I advised against it, adding a few graphic descriptions of the instrument's normal use. The third time the beeper went off, it was Howard.

"What're the emergencies?" Tegan asked when I returned.

"Oh, the first two weren't anything," I said, although the second caller might well end up being a "911" emergency. "But Howard has a problem with his sea monsters. I've got to go out to his place. You want to come?"

Tegan was the fourth and last person who knew about the sea monsters; we'd needed an extra hand a while back when Curious had undergone emergency surgery. Tegan had been enraptured by the monsters, and I felt sure she would enjoy seeing them again. The look on her face told me I was right.

"Of course!" she said, and once again we abandoned our laundry, and headed for the truck.

It was a pretty drive up into the mountains, with fresh new snow decorating cacti and fence rails, and if I hadn't been worried about the sea monsters I could have truly enjoyed the time spent with Tegan. But instead I worried, distracted; Howard had said that one of the monsters, Caddy, was out of the water, lying in the snow, oblivious to everything around her. It certainly didn't sound like the wasting illness that had killed the monsters' parents, but that wasn't much comfort. Looking out at the snow, I wondered if the problem was due to the weather; perhaps the water was too cold. But no, the monsters could always go down deep, where the water temperature was constant, and since they had gills as well as blowholes they could stay down as long as they liked. And if the water was too cold, well, lying in the snow was far colder.

I glanced at Tegan; she had curled up in the passenger seat for a nap, and underneath the purple tunic and spiked magenta hair she looked fragile and vulnerable. I had never seen her look that way before, and since she was asleep I let myself stare at her for a time. A few minutes later I realized that I had driven, oblivious, right past Howard's turn-off.

The mile-long drive from Howard's gate to the sea monsters' pool isn't easy at the best of times, and with ice and snow on the hairpin turns it was rather worse than usual. Tegan woke up during my last spectacular skid, just as I narrowly avoided sliding the truck into the pond. She stretched, shrugged into her leather jacket, and hopped out of the truck. Stiff and a bit shaky from the drive, I followed her.

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Howard was kneeling in the snow next to a motionless monster. "Thanks for coming," he said. "After I got Sweet Pea home I came up here to check, just to make sure that the snow wasn't bothering the monsters. And I found Caddy like this."

Slowly I approached, staring: I'd never seen one of the monsters come all the way out of the water on its own before. Caddy was lying sprawled in the snow, and she didn't even look up when Tegan and I approached. She seemed to be concentrating, wholeheartedly, on something *inward*. I swore under my breath, a steady stream of curses. Definitely something was wrong.

"She doesn't even act like she knows I'm here," Howard said, distressed. "What's wrong with her, Doc?"

"I don't know, Howard." I leaned over Caddy, peered into her eyes, and waved a hand in front of her. She blinked reflexively, but otherwise didn't react. I reached for the tentacles of her fin, but instead of clasping my hand she twitched her fin away. Again it seemed more a reflex than a deliberate movement. She appeared to be in a trance.

I said, "Has there been anything unusual about the monsters for the past couple of days?"

"No, not a thing."

"And the other monsters? Are any of them showing anything unusual?"

Howard gestured helplessly at the pool. "They're all acting strange," he said, "but I think it's because of Caddy. They've been hovering, watching her, and—"

Suddenly two of the monsters in the pool leaped out of the water in unison, then splashed down with ungainly belly-flops. A torrent of freezing-cold water drenched all of us, and Howard sneezed, took off his glasses, and tried to find a dry piece of clothing to wipe the lenses on.

"And," he said, "every so often they do *that*. I guess they're making sure she stays wet."

Mystified, I set about doing a methodical examination of Caddy. She was a strange creature, with a homely, wrinkled and bewhiskered face, a spherical body, a four-pronged tail, and a marsupial-type pouch. She was just a youngster with lots of growing to do (her parents had been *much* bigger) but she was already larger than I was. She was one of the quieter monsters, more placid than most of the others, sweet and gentle by nature. I checked her over twice, from her snout to her tail, and found nothing wrong with her either time. I certainly found no reason for her to be sitting in the snow.

I looked past Caddy and saw Tegan: she was kneeling at the edge of the pool, trying to coax the other monsters to come to her. My breath caught at the sight of her. She looked like a water nymph, or a mermaid, something mythical and beautiful. Her soaked purple tunic clung tightly to her body, and her wet hair was smoothed back from her face, emphasizing the graceful curve of her neck. As I watched, one of the monsters came to her (it was Curious, of course) and she clasped his tentacled fin for a moment before he swam away. Then she rejoined us, shivering, with her arms crossed in front of her and a strange faraway look on her face.

"Tegan, are you OK?" Howard asked. "You look sort of flushed."

"What?" Tegan looked up at him, startled. "Oh. I'm fine." She gazed at Caddy for a moment, then glanced back at the pond, and said thoughtfully, "You know, they really don't seem concerned about her. They're looking out for her, and making sure she stays wet, but they don't really seem *worried*, like they were when Curious was sick. And look what they're doing now."

In the pool, Curious and his brother Megamouth were swimming fast, side by side, circling the pool as if they were in a race. The others watched, staying out of the way, which wasn't at all normal. The monsters' games were typical-

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ly crazy free-for-alls, and nobody was ever left out.

"They don't usually do that," Howard said in confusion. "Doc, do you think maybe Caddy beached herself, like a whale or something? Maybe she *can't* get back in the water."

It seemed a reasonable idea, so the three of us took hold of Caddy and tried to drag her back to the pool. In response, Caddy grabbed a tree trunk with a finful of tentacles and held on tight.

"She doesn't want to move," Tegan said, panting. At that moment all nine of the other monsters plunged out of the water and began to lurch through the snow.

"No, no!" Howard cried. He made little shooing motions at the monsters, trying to herd them back to the pool, but all their attention was riveted past him. I turned to look where they were looking. There was a dog trotting through the snow, coming straight toward us. A big dog, trailing a leash. I stared in horror: it was Sweet Pea.

The monsters spread out in a protective semicircle around Caddy, who, aside from clinging to the tree, still seemed oblivious to her surroundings. Howard hadn't noticed the dog yet; he ran helplessly from one monster to the next.

"Doc," he said, "my *monsters!* They're all doing it!"

Sweet Pea was still coming; I cringed with every bounding step she made, expecting the overstressed sutures to give way at any moment. "My *surgery*," I moaned.

I saw Lynda then, determinedly scrambling through the snow after the dog, which couldn't be at all good for her flu and laryngitis. Sweet Pea bounded toward us, tongue lolling happily, and Howard finally saw her, and stared. The nine sea monsters moved in unison, slithering menacingly toward the dog. Sweet Pea skidded to a stop, looking disconcerted. She tucked her tail under her belly and ran back to Lynda, cowering behind her legs.

The sea monsters appeared satisfied with this reaction. The nine of them turned and dove back into the pool with an enormous splash, leaving Caddy alone on the bank. Then they hovered in the shallows, keeping a watchful eye on Sweet Pea.

"Lynda!" Howard cried. "What are you doing out in the snow?"

He ran to her, and I followed, anxious to check Sweet Pea's condition. Howard almost took Lynda in his arms, then backed hastily away, apparently remembering that he was soaking wet.

"I took her outside on the leash to go potty and she jerked away from me," Lynda whispered hoarsely. She looked at me accusingly. "I thought you gave her a full anesthetic."

"I *did* give her a full anesthetic. I can't help it if she's immune." I crouched down to peer under Sweet Pea's belly. Happily, nothing appeared to be torn open or hanging loose. I wanted to lift her lip and check her gum color, but I didn't particularly want to put my hand that close to her mouth. Sweet Pea solved my dilemma by snapping at me, giving me a nice view of her healthy pink gums. No internal bleeding, then, either. I smiled in relief.

"Lynda, you shouldn't be out here!" Howard said, fussing. "You'll catch pneumonia."

Lynda looked dubiously at our drenched clothing. "You're the ones who're going to catch pneumonia. Why are you both sopping wet? I thought you said that Caddy was *out* of the water."

"Well, she is."

"Where?"

"Right there," Howard said, turning. He blinked.

"Right where?"

Caddy was gone. A large muddy melted patch in the snow was all that marked where she had lain. Tegan waved from the bank and called out, "She's back in the pool! She just crawled back in the water like nothing happened."

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We hurried to join Tegan, Lynda with a stranglehold on Sweet Pea's leash. Caddy was swimming with the others, looking perfectly contented and perfectly healthy. If it hadn't been for the fin tracks and the melted spot in the snow, I might have thought I'd imagined the whole thing.

It was early evening when Tegan and I finally got back to the laundromat. In place of my wet clothing Howard had lent me some ill-fitting sweats, and Tegan looked decidedly odd wearing one of Lynda's crisp blouses and a pair of western-tailored jeans. The laundromat was still busy, but no one appeared to have touched our five washers. We scooped the laundry into a row of dryers and settled on the bench to wait.

"So what do you think was wrong with Caddy?" Tegan asked.

"I have no idea," I said. "I'm not sure anything *was* wrong with her. Maybe she was just sunbathing." I didn't really believe that, of course; her behavior had been bizarre. "At any rate I'm going to hope it was an isolated incident. As long as it never happens again, I don't care what caused it."

I settled back comfortably, contentedly watching the dryers spin, and my beeper went off. It had been quiet all afternoon while I dealt with the monsters; what was it about the laundromat that made it go off? Grumbling, I went to the phone.

The caller was a woman who wanted to report her neighbor for illegally cloning sheep. "I saw them this afternoon," she said breathlessly. "Two little sheep, exactly alike. They must be clones."

I explained that the lambs were more likely twins, which is rather common in sheep, and that in any event it wasn't against the law to clone sheep; it was cloning humans that could get you into trouble.

"But they were *clones*," she said insistently, and hung up. I sighed and headed back to the bench; at least it hadn't been a real emergency.

"What was it?" Tegan asked.

"Nothing," I said. "Um, Tegan? Since you've been helping me all day, why don't I buy you dinner?"

"Dinner?" She looked puzzled. "But we just ate at Professor Winston's house."

"Oh. That's right." I'd already forgotten the pile of sandwiches I'd devoured. "Then, um, what if—"

My beeper went off.

"Weird," Tegan said. "Is that thing sensitive to laundromats or something?"

This time, the caller was the local police. Apparently a woman had just called to report a pair of cloned sheep, and they wanted my expert opinion. After giving a lengthy dissertation on the subject of twinning, I returned to the dryers. Tegan was already folding blankets. She had an audience: two women in the next row were peering covertly around a washing machine. Tegan picked up the next blanket (faded pink, with iodine and bleach stains and a large ragged hole chewed out of the middle) and neatly folded it. Well, perhaps our blankets *were* a little odd-looking, but they were functional enough. I hoped the women weren't going to report us for having peculiar laundry. I helped Tegan finish the folding, and we were just about to make our escape from the laundromat when my beeper went off again.

This time it was Howard. Megamouth was out of the water.

We took only enough time to check on the patients at the clinic before heading out to Howard's place again.

"Are you sure you want to go?" I asked doubtfully as Tegan climbed into the truck. "It's already been a hell of a day."

"Are you kidding? It's not every day you get to work with sea monsters. Besides, I like the company."

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"Really?"

"Yes, really."

I was still worried about the monsters, but that didn't stop me from talking with Tegan on *this* trip. I chattered like an idiot, talking about the weather, the road, poetry (although I know nothing about poetry), and the pros and cons of tattoos. She in turn told me about her terrarium and her pet snakes. Even the mention of snakes didn't faze me, though I am most decidedly *not* a snake person. It took no time at all to get to Howard's place.

Howard was waiting at the pool. It was getting dark so he'd rigged a spotlight, and the light clearly showed Megamouth lying in the snow, just as Caddy had done earlier. In fact it looked like he was lying in the same spot.

"Look," Howard said plaintively. He was clutching an umbrella. "Megamouth's doing exactly what Caddy was doing."

"Is he in the same place she was?"

"*Exactly* the same place."

"What about the other monsters? Are they keeping him wet, like they did with—"

Howard sneezed, and I noticed that in spite of the umbrella his clothes were dripping. "Oh," I said. "They are."

At a loss for anything better to do, I gave Megamouth an examination. He was usually an outgoing, exuberant monster, but now he was paying no attention at all to my presence. He was behaving exactly as Caddy had behaved. And just like Caddy, he appeared to be perfectly healthy.

"Maybe it's some kind of game," Tegan suggested. "Like follow the leader, or Simon says."

Howard looked doubtful. "I don't think so," he said. "I mean, maybe that's it, but it just doesn't seem like a game to me. They seem so *serious* about it."

Well, I thought, if it wasn't a game, perhaps it was a competition, or a dare: who can stay out of the water the longest? Or perhaps it was some sort of conditioning exercise. Could the monsters be preparing for a cross-country trip? No, that was ridiculous; the monsters weren't built to travel on land, and besides they had to stay wet. A dried-out sea monster was a very sick sea monster; I'd learned that the hard way with Curious.

"There's no sense freezing to death," I said at last. "Let's watch him from the truck."

The three of us piled into Howard's truck, Tegan in the middle, and Howard turned on the heater. We all gazed at Megamouth, who lay serenely in the spotlight. Every so often there was a mighty splash from the pool, and Megamouth received a soaking. Occasionally Howard had to turn on the windshield wipers.

After a time I asked Howard how Sweet Pea and the puppy were doing, and he groaned.

"They're both OK," he said, "but Sweet Pea won't let the puppy come near her. Lynda's got the puppy in a box by her bed right now, and she's bottle feeding it."

"Well, that figures," I said. "Sweet Pea doesn't strike me as the motherly type. So when is Lynda's mother coming back for her?"

"Right before the wedding," Howard said mournfully. "That means almost two weeks of bottle feeding."

"Howard knows all about bottle feeding," I told Tegan. "He bottle-fed all the monsters when their mother died. They were tiny little things, still in the pouch."

"Really?" Tegan said, eyeing Megamouth. "How little were they?"

"*Very* little. All ten of 'em fit in a bucket, with room to spare."

"Wow. That's hard to imagine."

"I have pictures at home," Howard said proudly. "Do you want to see them?"

"Oh, yes," Tegan said.

Howard looked pleased. He'd set up a home darkroom just so he could safely

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develop the monsters' pictures himself. If it hadn't been so important to him to keep the monsters a secret, I'm sure he would have carried their pictures in his wallet. (He did carry a picture of his favorite tortoise, Max.)

"Look," Tegan said abruptly.

Megamouth was moving. He very slowly pulled himself up on his fins, stretched like a clumsy walrus, and began to lumber toward the pool. Slowly, calmly, he slid into the water. The other monsters joined him, and in a synchronized group they dove smoothly beneath the surface. We all got out of the truck and looked at the muddy patch where Megamouth had lain. The ripples in the pool faded gradually into a smooth blackness, and a few snowflakes began to fall.

"Weird," Tegan said.

On Monday morning Howard called and said that so far no one else had left the pool. There had been more snowfall during the night, and the fresh snow around the pool was undisturbed.

"The monsters seem fine," he said. "I don't understand it."

"Neither do I," I said. "Well, keep me posted. You'd better check them frequently for a while, just to be sure. How's Lynda?"

"She's doing better," he said, and sneezed.

"And Sweet Pea, and the puppy?"

"Oh," Howard said dismally, "they're fine." Apparently he wasn't enjoying the round-the-clock bottle-feeding.

"Good, good. By the way, do you know anybody who repairs washing machines?"

I had just enough time to call the washing machine repairman before the morning appointments began. It was a typical Monday morning (an iguana with ticks, a lame pigeon, and a dog that had eaten a Pound Puppy, among others) and I was relieved when I finally got to the last appointment. I glanced at the chart: my patient was Lass, a ten-month-old female Australian Shepherd, and the presenting complaint on the chart was "getting fat."

Lass appeared to be an exuberant and active dog: as soon as she entered the exam room she began to literally bounce off the walls. After she'd knocked down a couple of posters (the life cycles of the flea and the heartworm) she finally settled down, amusing herself by running laps around the table. She didn't seem to be the sort of dog that would be inclined to get fat, but she certainly did have a big belly.

I caught her as she ran past, palpated her abdomen, and had an immediate diagnosis.

"Well, Mrs. Quinn, Lass isn't fat after all. She's pregnant."

"Pregnant?" Mrs. Quinn looked shocked. "She can't be! You must be mistaken."

"I'm afraid not, Mrs. Quinn. She's quite far along, and I can feel the puppies clearly. I'd expect her to have them within the week."

"But how could she be pregnant? The only dog she's with is her brother, and he couldn't possibly be the father."

"Why not?"

She stared at me in horror. "Why, they're brother and sister! They wouldn't *do* that!

I never did convince Mrs. Quinn that dogs had no incest taboos, but after I admitted that another dog might *possibly* have jumped over the fence into the yard, mated with Lass, and jumped out again, she was able to accept the notion that her dog was pregnant. I gave her instructions for whelping and nursing (hopefully she wouldn't have to bottle-feed) and ushered her out to the waiting room.

Shaking my head in disbelief, I went back to the exam room to pick up the fallen posters. It was amazing, really, what some people didn't know about their pets. I hung the life cycle of the flea on the wall, then picked up the life cycle of the heartworm. Of course,

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some things *were* pretty complicated: the life cycle of the heartworm, for instance. The dreadful little creatures started life as microfilariae, microscopic larvae swimming in a dog's bloodstream. When a mosquito bit the dog, the microfilariae were sucked up along with the blood, and while they were in the mosquito's body a critical metamorphosis occurred. When the mosquito bit another dog, the modified microfilariae molted yet again, settled into the heart and lungs, and happily grew into large disgusting parasites, several inches long, some male and some female. The males and females mated and produced more little microscopic microfilariae, which again had to be consumed by a mosquito in order to develop . . .

It was an incredibly complex cycle, really, so complicated it was amazing that heartworms could reproduce at all. Yet they were endemic in the southeast, and they were spreading fast. Over the last few years they had begun to appear regularly even in desert areas like ours. And there were plenty of other examples of bizarre yet successful reproductive cycles. Tapeworms, for instance, which shed entire body segments. Platypuses, which laid eggs and then nursed the hatchlings, despite the disadvantage of not having teats on their mammary glands. The monsters, of course, were marsupials. I'd seen all ten of them in their mother Nessie's pouch. But what exactly had happened before they arrived there? I'd always assumed that Nessie had given birth to tiny undeveloped young, and that the baby monsters had crawled directly into the pouch like baby kangaroos. But what if something different had happened?

I dropped the heartworm life cycle poster and it crashed to the floor for the second time.

I only had one farm call that afternoon, and by a stroke of luck it was on the way to Howard's place. As soon as I'd finished with it I was on the road again. Tegan was with me; she said she didn't intend to pass up any sea monster visits.

The afternoon was sunny but cold, and when we climbed out of the truck a stiff breeze blew up, sending ripples flying across the surface of the sea monsters' pool.

"What are you looking for?" Tegan asked curiously.

"I need to find the place where Caddy and Megamouth were lying." I hoped I could find it; the night's snowfall had obliterated the fin-tracks and the muddy wallow. Howard and Lynda drove up and joined us. They both looked as if they hadn't had any sleep, and Howard appeared to have caught Lynda's flu.

"There it is," Tegan said; she'd spotted the tree that Caddy had been clinging to. Beside the tree there was a low spot where the snow made a gentle dip. Carefully I knelt beside the place and cleared the snow away. When I reached the mud I slowed down, examining it carefully, and then I began to dig through it, cautiously shifting one fleck of soil at a time.

"*Now* what are you looking for?" Tegan asked.

"I'm not sure yet."

I poked through the mud for about five minutes, not finding anything. Then I had a thought, and went to the truck for my magnifying glass. Slowly I cast back and forth, staring through the glass. Even with the magnifying glass, I very nearly missed it.

It was a cluster of tiny, silvery eggs, each scarcely bigger than a pea. The eggs glinted with moisture in their muddy bed. Silently I pointed them out to Tegan, Howard, and Lynda, passing each of them the magnifying glass.

"You mean Caddy laid these eggs and Megamouth—Megamouth, uh, fertilized them?" Howard's face turned bright red; he seemed to be embarrassed because he had been watching while it happened. "But, they're marsupials! Marsupials don't lay eggs."

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"No, they don't," I agreed. "And animals with blowholes don't have gills, either."

"Oh." Howard stared at the eggs. "So what are these going to hatch into?"

"Maybe nothing," I said. "They may not be fertile; I'd have thought the monsters were still too young to reproduce. But who knows? Maybe they'll hatch into tiny little monsters, and Caddy'll come back and put them in her pouch. Or maybe it's something more complicated. Some whole different part of the life cycle."

"What do you mean, a different part of the life cycle?" Howard was still staring, mesmerized, at the eggs.

"They might hatch into some kind of intermediate form, a different sort of creature altogether. They could live in that form for months. Maybe years. Then after some sort of stimulus they could metamorphose and return to the pouch for their final development. By that time the mother monster might have reached *her* full maturity."

I had speculated about several other even more complicated reproductive scenarios, but Howard was already getting a glazed look; I decided not to go on. It was all just speculation, anyway. There was even an outside chance that the eggs had been laid by something else, and Caddy and Megamouth had just happened to lie on top of them. But I didn't think so.

Carefully I covered the eggs with mud and snow, just as they had been before, and stood, brushing snow off my pants.

"What should we do with them?" Howard asked anxiously. "Should they go in an incubator or something?"

I shook my head. "Don't do anything with them. Leave them alone."

"But it's so cold."

"That may be exactly what they need. After all, Caddy waited till it started snowing before she laid them."

There was a splash from the pool, and we looked up to see all ten monsters regarding us curiously. They didn't seem at all concerned that we were standing next to the eggs. I didn't know if this meant that they weren't protective of the eggs, or if they just trusted us with them.

"Oh dear," Howard said. "I should have taken pictures of the eggs before you covered them up." He looked crestfallen, like a grandfather who'd missed the perfect baby picture.

"They wouldn't have shown up very well anyway," Lynda said comfortingly.

"I suppose not." He brightened. "But Tegan could look at the *other* pictures while she's here."

While Howard proudly showed Tegan his sea monster baby albums, I looked over her shoulder (though I'd seen them before) and wondered about those babies. Just how old had they been when their mother Nessie had died, when they were small enough to fit in the palm of my hand? How long had they been in the pouch? Had they lived in a larval form before reaching the pouch? If they had, how long had that lasted? And did they remember that other part of their lives?

On Howard and Lynda's wedding day I woke up with the flu. I dragged myself out of bed, put on a suit, and drove blearily to the church, wishing that I hadn't agreed to be Howard's best man. At least I wasn't on call this weekend, and there weren't any patients in the clinic, so as soon as Howard and Lynda got married I could go home, crawl back in bed, and stay there.

The wedding went fairly smoothly, as weddings go. I did have a bit of trouble with the ring (when I reached into my pocket for it I came up with a throat lozenge, which I dutifully tried to give to Howard), but eventually I found the ring and the ceremony went on. Then there was an outbreak of screaming from the pews, and several people hastily moved away from Tegan, who had absentmindedly left her house with a small snake draped around her neck. After the cere-

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mony was finally over, I went to find Tegan. She was wearing a yellow leotard and a long green skirt, and the yellow-and-green snake around her neck looked like a rather fashionable necklace. Her normally spiked magenta hair was smoothed down, presumably for the occasion. To my feverish eyes, she looked utterly beautiful.

"Hi, Michael," she said. Abruptly she sneezed, startling the snake, which lifted its head from her throat and flicked out its tongue.

"'Scuse me," she said. "Woke up with the flu."

"Me too," I said. "Want a throat lozenge?"

"Oh, yes. Thanks."

"Are you going to the reception?"

"I don't think so. I don't feel so good."

"Me either. I guess we should find Howard and Lynda, and tell them we're leaving."

We wandered together out into the foyer, and found Howard and Lynda heading for the reception hall.

"Congratulations," I mumbled around a throat lozenge. "Lovely wedding. We have to go now. Flu, you know."

Howard and Lynda (both looking disgustingly healthy today) gazed at us with pity.

"I wish you could stay," Howard said. "But believe me, I know how you feel."

"I forgot your wedding present," I said, "but I'll give it to you next time I see you."

"Oh, thank you," Lynda said.

"It's towels," I said. "Towels are always so useful, you know." I'd had to go to the store to buy new towels for the clinic anyway, but fortunately I remembered not to mention that.

"Thanks," Howard said. "I've got something for you too." He reached into his pocket and handed me a tiny box. "See you guys later," he said. "Get well."

Howard and Lynda moved off to the reception hall, and the crowd moved with them. Soon Tegan and I were alone in the foyer.

Carefully I opened the box. It was some kind of miniature jewelry box, the sort a ring would come in, and it was lined with crushed black velvet. In the center of the velvet lay a tiny silver fragment of eggshell.

"Oh," Tegan breathed, "they *hatched!*"

We both gazed raptly at the silver shard. Where were the hatchlings now? I wondered. *What* were they now? I looked up at Tegan. Her eyes were bright, with wonder and with fever.

"Amazing," I said softly.

"Yes," Tegan said, and kissed me. I dropped the open box, and both of us fumbled to catch it before it hit the floor. Then I carefully closed the box's lid, the eggshell still safely inside, and kissed her back, and I didn't even care that I was kissing a woman with a snake around her neck.

And that was amazing indeed. ■

(Editor's note: Howard and his monsters have previously appeared in "Little Monsters" [November 1989], "Business as Usual" [July 1991], "Strange Things" [June 1992], and "Yellow and Orange Blues" [May 1998].)

You cannot teach a man anything; you can only help him find it within himself.

—Galileo Galilei

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Shane Tourtellotte

LIVE BAIT

Some humans will take almost anything as a personal challenge. . . .

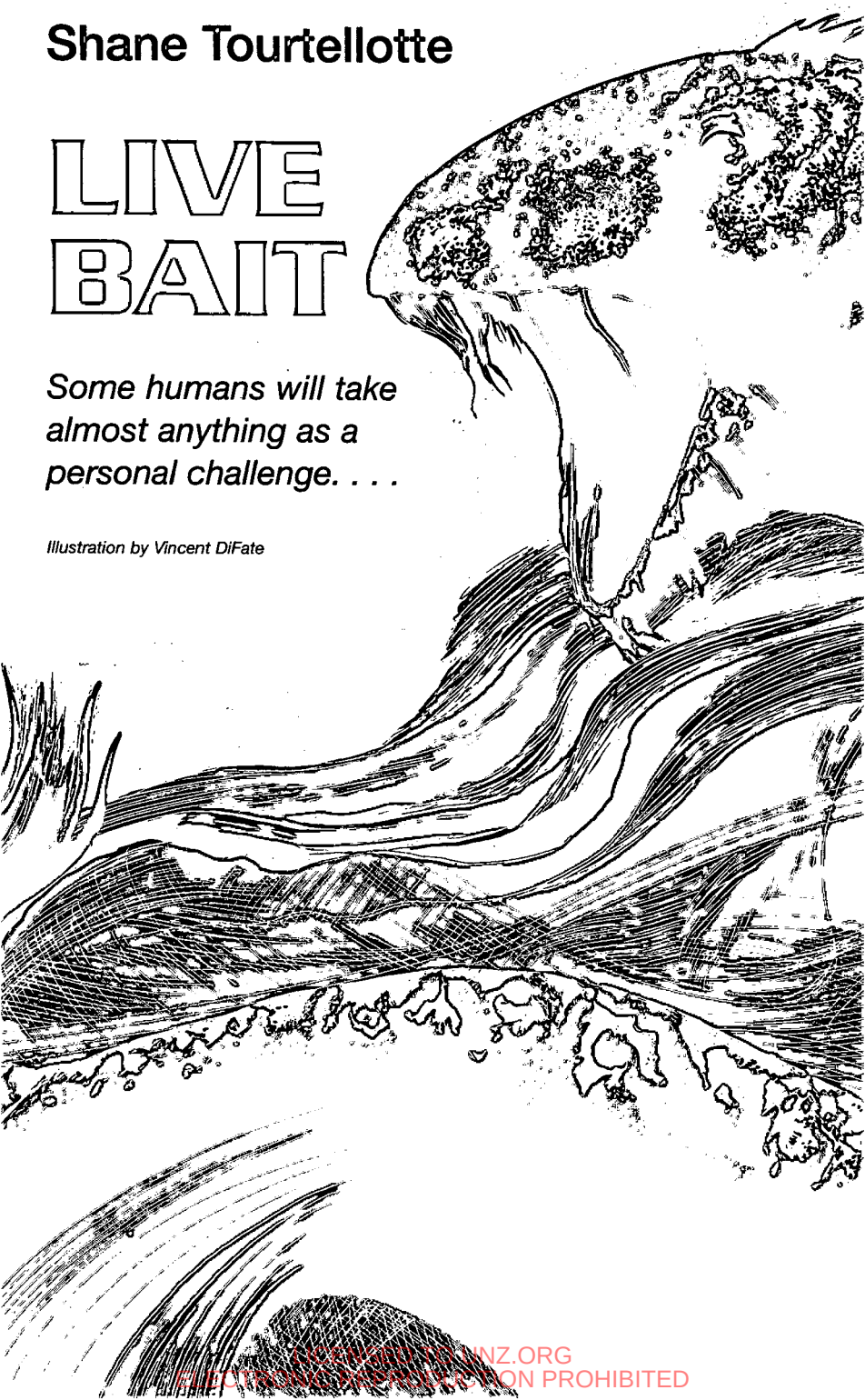

Illustration by Vincent DiFate

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The supervisor's door opened itself at my approach. Nguyen Duc Pho looked up, and immediately saw something he disliked. "You don't seem happy to be here, Dar."

I shouldn't have let my annoyance show. He could contact me in my workbooth, but he loves face-to-face meetings. I softened my visage, despite his using that nickname I hate.

"Just a feeling it's bad news, sir." Police work rarely gives one good news.

"Nonsense. You always look that way. Sit down." The door swung shut behind me as I obeyed. "Truth is, this is probably good news for you. I'm sending you to the coast."

A grin split his round, bald head, as though I should have thanked him right away. "For what?" I asked cautiously.

His smile reversed. "For work, of course. You've heard of jet-divers, haven't you?"

"Vaguely. No, definitely. But what—"

"Well, the Adaptionists finally filed a formal complaint against them, for cruelty to native species. The Plaza wants it investigated expeditiously." He said it like he was reciting. "They gave me choice of assignment, and I picked you."

Again, that expectant smile. I couldn't oblige him. "The Plaza? Agreed, colony government has final jurisdiction, but why couldn't they pick a local department?"

"Because they want this discreet, too. Jet-divers will probably know any local police they could send, so we're sending one they don't know. When I saw you listed, my mind was made up."

"Mister Nguyen, sir, I wouldn't call myself a diver. One vacation a couple years ago—"

"And a full training course before that. You're qualified." He lifted a pad off the neat pile at his desk corner. "All the details are there. I want you in Oahe Harbor by tomorrow noon."

"Tomorrow?" This was too much. "Sir, I had personal plans for tomorrow. It's listed on the department schedule. I think you should find another inspector for the job."

Nguyen's face darkened. In the proper mood, he would have been a perfect model for those jolly Oriental idols of ancient times. He never seemed to find that mood.

"No. I shouldn't. Quinn, I've had hopes for you for years. When you apply yourself, you're one of my best officers, but you never do motivate yourself. You always need prodding. That inertia of yours has cost you promotions more than once."

"I know that, sir." His reminders are like clockwork.

"You know, and still you don't act. I've been forbearing, Quinn, but if you shirk this, my forbearance ends. Am I pellucidly clear?"

I swallowed. "Pellucidly, sir." God, I hate that worse than 'Dar.' "I can . . . work around my personal plans."

His scowl lightened to a frown. "I hope so." He shoved the pad to my side of the desk. "Read up on the background, do the research you need to from here—and be in Oahe bright and early tomorrow."

"Yes sir," I replied, forcing myself not to slump in his chair. "Tomorrow."

"Tomorrow?"

Moire is far more beautiful than Nguyen when she's angry, but makes for just as much anxiety. "You told him about tomorrow, didn't you? Or did you forget?"

"I did. Tell him, I mean. I wouldn't forget *this*, Moire."

I reached a hand for her stomach, still flat, but she pulled away. "He can't make you forego absent days, Darragh. You have rights. Why didn't you fight for them?"

"Because he made it 'pellucidly clear' it was as much as my job is worth to refuse."

"He threatened to discharge you?"

"Not in those words, but—"

"But you heard what you wanted to

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hear." She stormed past me, out of the kitchen.

"Moire!" I recovered in a moment, and followed her. I found her seated in the dining room, hazel eyes staring fiercely at the wall, slender fingers drumming on the table. It was a ravishingly beautiful pout, but still a pout. "I think you're being unfair."

"So are you." Those eyes seared me momentarily, then moved on. "But I suppose it doesn't really matter."

"It matters to me." I approached. "This is our child. I wanted to be there."

"But you won't be, so I'll adjust." She shifted, turning her shoulder toward me. "I don't need my husband there for the transfer. I can be my own moral support. You needn't concern yourself."

I tried to protest again, but my mouth wouldn't serve me. The silence became too much, and I retreated to the bathroom.

A shower cleansed me outside, but left my insides still knotted. I spent a long time looking at myself in the fogged mirror, pale eyes surveying pale skin, glancing over the sharp widow's peak Moire likes so much, and is so much trouble to gene-gin into permanence.

Was I a weak man? I couldn't properly stand up for myself against Nguyen or Moire—but they both had points.

I'm not motivated at work: it's not what I imagined doing on Niya when I arrived as a wide-eyed colonist, seven Terran years old. As for Moire, it's uncommon for a woman to be pregnant, even for forty days. I made allowances for her condition, but apparently not enough. Now she'd have to undergo the embryo transfer alone, and I could have been with her—if I had stood up to Nguyen—if I had done my job right in the first place.

My job. I got dressed and went into the workroom. If I wanted to do my investigation right, I had to get onto one of the jet-divers' expeditions, and there was little enough time for that. I called the first outfit listed in my assignment file.

"Jonah Expeditions. Paul Golba speaking."

Paul didn't look like a daredevil. His face was stuck in adolescence, the gangly, awkward kind. His voice had authority, though.

"Good evening. My name's Darragh Quinn. I was wondering whether your next expedition had room for another."

"You're in luck. We had a cancellation yesterday. I will need data about your level of experience."

I uploaded my training certificate. "Do you object to having regular sightseers along? I'd like to see jet whales up close, but I'm not convinced I want to throw myself into one."

Paul laughed. "Our expeditions usually start fifty-fifty that way, but we always convert one or two." A hold pattern briefly played across the screen. "Your training is OK, but I'd like you down here tomorrow for some extra lessons. We have a few others on your level, so you won't stick out."

"I understand. When do you launch?"

"Morning after. We'll be in position to catch the leading edge of the migration. Ever dived with jet whales before?"

"Uh, no. Just river diving."

Paul grinned like a kid. "Trust me, this beats anything you've ever done before—even if you don't go through the Big Squeeze. See you tomorrow."

I awoke very early, and slipped out of bed without waking Moire. We had made perfunctory apologies before turning in, but I was glad to leave without speaking again.

The trip from Sakakawea to Oahe Harbor was six hundred kilometers by levrail, three hours I hoped to fill by studying jet whales. For all the recent fuss over them, I didn't know all that much myself. I was afraid Paul would sniff me out for a fraud over the screen.

I watched recordings of them. Not whales in the old sense, but gilled fish. Fifteen meters long, a hint of green in their rippling gray skins, great stiff tail-

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fins trailing to wisps of flesh—and those maws. Stretching out to engulf huge mouthfuls of water, to drive the length of their bodies and out the end, propelling themselves with endless waves of contracting muscles and jetting seawater.

And in one of those recordings, human divers hurling themselves down those throats, reappearing after a few seconds that last for ages, unharmed, arms pumping in exultation. I shook my head with amazement, and that brought a wave of sleepiness over me, my early rising catching me from behind.

I slept most of the way, my nodding brain full of huge, dark, undulating shapes. Once I even felt the smothering, crushing pressure of a huge throat around me—before the train and I both jolted.

Barely was I into the station before two strangers converged upon me. "Detective Quinn?" the woman quietly asked.

"Yes?"

"Cassidy Nickells, from Call to Adapt." She shook my hand, hard for so small a woman. "My colleague is Professor Nelson Topa. We're glad the authorities are finally responding."

"Wait, wait." I led them to a untrafficked corner. "I thought my investigation was supposed to be clandestine."

"Yes, but we requested it," Topa said. His dark, gray-fringed face was familiar, but I couldn't pin it down. "We have considerable political capital invested, and an interest in its outcome."

Politics. Just what I needed. "Professor, ma'am, if you're looking for someone to validate a foregone conclusion, I'm not your man. I plan to run a disinterested inquiry, which if your claim is valid, should satisfy you."

They stammered briefly. "We wouldn't think of influencing your conclusions," Nickells said. "We just want you to understand how important a timely resolution is. Every day that passes, jet whales are put in further danger."

"And legitimate research is hampered through frivolity and thrill-seeking."

I finally placed Topa: I had seen and heard him on educational programming about Niyan marine biology. Smart man, but he knew it too well.

"Those are your allegations," I said mildly. "It's my job to determine whether those are the facts. If the jet-divers see you tagging along, they won't act naturally around me."

Nickells's face puckered. "Do I gather you're . . . going to become one of them?"

"I'm diving with them, yes, but not jet-diving." Nasty thoughts entered my head. "Have you made it public that they're being investigated?"

They glanced at each other. "No," Nickells said, unsteadily.

"Well, don't. If they're prepared, my report will inevitably be incomplete, and the next investigation won't come until the spring migration."

Another glance. "I think we understand. We'll leave you to your work, Mister Quinn." She left hastily, Topa pushing to keep up.

I found my way to the docks, breathing in the salt and metal tangs of the ocean. Jonah Expeditions's headquarters was an annex to a diving equipment shop, and I passed by once before noticing the sign. I hoped they were more reliable than this front promised.

Paul was right there to greet me, along with some fellow expedition members. He introduced me to his brother straight away, though I didn't believe him at first. Jim Golba was two heads shorter, well muscled, and as tanned as his brother was white. It takes a lot of outdoor exposure to get a tan from Dakota's modest UV output.

"You're the last of the live bait, then," Jim said, crushing my hand in his grip.

Paul smiled patiently. "That's what he calls every new diver. Don't take him literally."

"Right. All in good fun." He slapped

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my back. "See you around, chum. Haha."

The others were more mundane, though I immediately noticed there wasn't a woman in the group. Risk-takers tend to be male, but this defied even those percentages. I didn't dwell on it. I had other concerns.

"You didn't bring your own suit," Paul observed.

"I thought I'd rent here." My expense account wouldn't cover an outright purchase. "You'll have all the proper accessories handy?"

"Sure." Paul led me into the scuba store, and went over various models like he had memorized a catalog. We settled on a good mid-range suit, with heads-up mask display, flip-top keypad on the left forearm, intersuit mike, and automatic buoyancy control with decompression safeguards.

He insisted on strong suit materials, though downplaying the crushing force of a jet whale's throat. "It's actually rather pliant inside. The flesh has to be able to fit around obstacles, close the throat completely to get full propulsion. Still, we don't want equipment damaged, or divers."

The last members had arrived in the interim, men again. Paul took some of us to a cordoned square of water behind the shop, for our refresher dive.

"This is merely to reacquaint you with the water," he told us as we suited up, "and with proper safety techniques. Diving in the strait will be different, but we'll have experienced buddies for each of you." He paired us off, assigning himself to me. I began wondering whether he suspected something.

The harbor water wasn't bad for mid-autumn, though there wasn't far to see. Paul put us through paces, giving orders through his mike. The mouthpiece made for muffled speech, and the henox mixture in his tank for a high voice, but we understood simple orders well enough. I got through without any serious anxiety.

Once we had surfaced and changed, he led us to the chartered boat that would take us into Oahe Strait. There I saw the first woman involved in this venture, and she owned the boat. She watched with a sober, professional look as we boarded.

"Some of you already know Lyss Mehtz," said Paul. "This is her second time taking us out. Let me introduce you around, Lyss."

I greeted her in turn, slightly mortified by a residual squeak from my helium-bathed throat. Work had hardened her body and hands, but her face, while weathered, was still young.

We went below to stow our equipment. Some of us—I was already counting myself part of the group—started talking about the diving tomorrow. The experienced hands were much more calm than the 'live bait'—with one exception.

"It's like the best sex in existence, and you're the penis." Jim's bawdy assertion brought some whoops as we climbed up to the deck. "All that flesh around you, pulsing, throbbing, thrusting, and finally, in one last orgasmic spasm—"

"You're shot out its butt."

Raucous jeers met Jeff Barton's capper. I saw Lyss Mehtz forward of us. She very deliberately took no notice.

Paul waved the boisterousness down. "Before we get deeper into, er, before we go on with this—quiet, Jim—let's pick a place for dinner tonight."

I let them sort that out, but tapped Paul's shoulder. "I have to check into my inn for tonight. Can you hold up dinner for that?"

"Sure. We'll give you an hour." He named the restaurant, and sent me off with his usual grin.

It took the desk clerk an hour to dig up my reservation, mumbling some song to himself all the while. I had hoped to get some crash studying done in my room before dinner, but I barely had time to drop my bag onto the bed.

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The gang was already talking up a storm when I arrived. I got a seat next to Jim, naturally, who was in the middle of recounting a jet-diving anecdote.

"—had a bowel movement, right in the middle of his dive. Brendan came out covered, dripping—" He began breaking up. "—and with an air bubble right around his—" Jim's hands framed his head, as he burst out laughing.

The group emitted various groans. "I'm glad you got that out of the way *before* the food arrived," Paul said.

"Hear hear," Jeff said. "I guess that's why this Brendan guy didn't come back for more."

Jim shrugged. "Hey, it's nature. If you can't take it, stay home."

The conversation did turn more appetizing, a perfect parallel to the seafood. My braised grayfluke was indescribable. Soon Paul had the floor, and began philosophizing about jet-diving, much less lewdly than his brother.

"It's the birth experience. I'll always believe that. Passing through living flesh, emerging into the world. Deep down, that's what we're trying to recreate. It's central to human experience, and with modern technology taking that away, it's no surprise some people feel a need to rediscover it."

Silence came over the table, long and pensive. Mark Wentz, on my left, spoke first. "I just wanted to dive through a fish."

Nervous laughs dispelled the tension. "OK, that's his reason," Paul said. He waved a fork, encompassing the table. "Let's hear why everyone else is here."

There was a range of motivations: breaking monotonous routines, seeking the ultimate adrenaline surge, testing one's own limits. I started realizing how young the group was. I wasn't the oldest at fifty-eight, but some looked under forty, in college or even earlier. Years are short enough on Niya without having mounds of them pile up between yourself and your peers.

"Well, Darragh?"

The question had come around to me. "Like I told everyone, I'm just watching. I guess . . . I wanted to see jet whales, up close, not on a screen. Something huge and tangible and alive." It sounded lame, but it was the best cover story I could improvise.

"Just nature-loving?" one asked. "I didn't think those types liked what we did."

I grimaced. "Maybe they don't. I don't know."

"It's not as simple as that," another said, pointing at my hand. "If you're here alone, what about *her*?"

I drew back the hand with my ring. "She . . . didn't want me to come here. It created some friction. I'd rather not discuss this, OK?"

Understanding murmurs rose, and the interrogation passed to the next fellow. My impromptu performance had been convincing—and less of a performance than it felt comfortable to admit.

I finally got back to my inn room. I left messages on Nguyen's office machine, and my home server. Either Moire wasn't home, or her resentment had resurged in my absence. I was almost relieved at not having to speak to her.

She had insisted on that vacation three years ago, to explore the depths of the New Missouri with friends she knew. I took the lessons, made the dives. Moire had the adventure she wanted, without finding out how claustrophobic I found the whole thing.

If not for her, Nguyen would never have fingered me, or lectured me, and Moire and I wouldn't have had that argument. She blamed it on me, but it came back to her. I couldn't tell her so directly, but surely she could see it for herself.

I spent an hour hunched over a screen, studying jet whale anatomy. The only specimen humans had studied had washed up on a beach five years ago, yielding its knowledge readily to the scientists who swarmed over it. A year later, the daredevils had begun exploiting that knowledge with their stunts.

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The esophagus and stomach lay below the main throat. I'd want to hug the top wall if I went through—and I wouldn't. My eyes blurred over the rest. Dorsal and ventral swim bladders, with ears near both to exploit the resonance; the two hearts at opposite ends of the creature; two stomachs, one to crush, one to digest; the spiral intestine; the forward-mounted reproductive organs . . .

Moire. I hadn't even thought about the transplant. I called our server back, checked the time indices, and sighed. She had used it last a few hours ago, well after her appointment. No complications, no worries.

Resentment is treacherous. Each step seems firm, but only sinks you deeper into the quagmire. Eventually, there's no solid ground within reach.

I doused the light, climbed into bed, and cleared my mind. I could retrace my steps now. I hadn't gone too far.

The alarm woke me out of dreams of dark ocean, and great creatures, and the sensation of sinking lower, ever lower. Never before had I been glad to wake up at five.

I boarded the *Mehtz-o-Soprano* in predawn darkness, her engine already softly purring. I munched grain bars with the others as we waited for stragglers. Finally we cast off, the horizon's smudgy glow off our starboard bow, as drizzle began falling.

Paul was with Lyss in the wheelhouse for an hour before emerging to address us. "Good news from our friends off Wau Bay. The leading edge of a pod just passed them. Good numbers. They've also drawn a few Adaptionists and reporters with them, so that's less interference for us, if we're lucky."

"Interference?"

I must have spoken aloud. "That's right. The reporters are just snoops—airships, mostly. The Adaptionists will try to drive the jet whales away from us, with subsonics and chemicals.

"Speaking of which," he projected to the group, "time for your jet-diving tutorial, or refresher for you veterans. Bring your suits and tanks, and a bottle of Depropal out of the storage locker, and meet back here."

I was the last back on deck, mostly from wool-gathering over what the Adaptionists might pull. I hadn't forgotten my mission, and knowing they were under unfriendly eyes might change the divers' routine. I didn't want that.

Once I clanked back into place, Paul began running down proper procedure for diving with jet whales. He concentrated on the Depropal right away. The chemical inside that spray bottle numbs the palatal fringes of jet whales. If it doesn't taste you, it doesn't shunt you out of its throat, into its stomachs.

"Coat yourself completely," Paul said. "especially all exposed skin. *Never* stint with Depropal. Don't even count on your suit to keep your chemical traces inside. In over three hundred documented jet-dives, we've never lost anyone. Let's keep it that way. Remember, Depropal *is* your pal."

He moved on to proper jet-diving technique. I listened closely, though I wouldn't need the information. I was glad to find he recommended cleaving to the top, hands pressed to the throat wall. "Always keep oriented," he said, leaving the possible consequences of failure unspoken.

These were not happy-go-lucky pranksters. They took their activity seriously. That didn't necessarily mean they weren't doing harm, though. I hefted my Depropal bottle.

Paul had gone into which whales to avoid diving through when one of Lyss's crewmen came back to us. "Captain says boats are coming."

Paul grunted, and went to the wheelhouse. Jim took his place in the lecture, finishing up just as the engines cut and his brother returned.

"All right, some Adaptionists are trailing us." Moans and curses. "I've decided now's the best time for our shake-out

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dive. With any luck, they'll think it's the real thing, and tip their hands as to how they'll disrupt us."

He assigned us buddies. I got Joe Weber, a veteran 'just looking' participant. We spent twenty minutes planning our dive, checklisting each other's equipment, and spraying ourselves down. By the time I spotted two boats approaching from the southwest, we were ready.

We followed Paul and Jim into the ocean. Weak, cloud-filtered sunlight suffused the water. I felt it pressing around me, but managed to hold off the sensation.

Visibility was moderate, and what I could see helped me forget my claustrophobia. Whole shoals of fishes swam through the sea, more distant ones seeming to appear and disappear as their members turned this way and that. I spotted platefish, puggies, weavers, grayflukes, without even trying.

Something squirmed past my arm. I turned to watch a red gulper shoot past me, throbbing and squirting, water swirling in its wake. Its much bigger cousins were nowhere in sight, still off around Wau Bay.

I felt a vague headache coming on. I checked my depth, but Joe and I were fine. Then I looked upward, and there were three boat keels where there had been one. Two of them had boxy nodes near the bow.

I remembered Paul's words: subsonics. They were trying to ward away the jet whales. They sure did give me an itch to surface, but I stuck it out. Joe didn't seem affected, that or he was playing tough too.

Paul and Jim were close to one of the Adaptionists' boats when a yellow spill came down almost on top of them. It diffused into the water rapidly, but not before our hosts did something with scoops on short poles that I couldn't make out.

I stayed down a while longer, but we had accomplished Paul's goal. Back on the *Mehtz-o-Soprano*, I buttonholed him to ask what those scoops had been.

"Sample collectors. We need to know what they're using, though from the color, I'd guess chemoreceptor binders. Get that on you, and no Depropal will be able to out-argue it."

My face collapsed. "You mean—"

"Yep, I mean. Jim and I'll have to change suits. You weren't close, were you?" I shook my head hard. "Good." He patted my suited shoulder. "You did well, first time out."

This was a kid, or close enough, giving me encouragement. I still liked it. I didn't let myself enjoy it long, though.

I gave Lyss my used tanks in the utility room, for refilling. Her look was casually neutral, yet it shot a quiver through me. I was getting far too involved in this expedition.

Down below in the bunk space, I found my pad and jotted down my observations, the practices, the chemicals—for both sides—the overall sensation I had so far. Rummaging for my phone, I linked the two and uploaded to Nguyen's office.

Then I scanned the directories for Nickells and Topa. I felt like chewing them out, telling them to leave my work alone. The work of finding their numbers gave me time to overcome the temptation—and a swifter path to yielding to it should it come again.

Hearing a step, I hid my pad under a pillow. It was Jim, giving me a smirky look. "Interrupting something?"

"No. I was about to call home. My wife."

"Ohhh." His smirk turned derisively pitying. "Feeling the tug of the chain."

I lowered the phone and raised my voice. "She's just—oh, I don't have to explain anything to you. Kindly butt out."

"Fine." He backed away, unrepentant. I held the phone in my hand a long, blurry moment, then stuffed it back into my bag.

Back on deck, the constant drizzle had intensified. I ignored it: my clothes couldn't get much wetter. The other

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boats hovered nearby, stern sentinels in the mist, while a buzz overhead drew my eyes to a dirigible, a news logo spanning its side. Suddenly my job-turned-vacation felt like a siege.

I spotted Paul pacing under the wheelhouse's overhang, glancing at a watch. "Counting surface time?" I guessed. Safety demands a break between dives.

He nodded. "You might want to grab a little bite. We should go down for real in—" Glance. "—forty-five minutes."

I looked over to the Adaptionists again. "If you say so."

Lunch was nondescript and short. I was back on deck in ten minutes, only now Paul was in the wheelhouse with Lyss. "That is an open channel," Lyss warned.

"Exactly. Thanks." He began calling someone named *Star of the East*, which I gathered was the jet-divers' boat from Wau Bay, and described the chemical he believed the Adaptionists had dumped. "If there had been any whales about," he said at one point, "someone could have gotten eaten." Precisely the reminder I needed.

Paul finished his call. "Move us away nice and easy until we get a clear line north, then gun it. Darragh." I straightened. "Spread the word. We're diving again in thirty minutes. Find your buddy and suit up."

I delivered his message, as our boat began inching east. The others moved to cut us off from a northward dash, but found the news dirigible descending to cut them off. I watched the cameras swivel from its underbelly, and heard indistinct voices sound from forward speakers. I realized they were interrogating the Adaptionists about their dumping.

When we sped north, one boat tried to follow, but the airship kept between us, stubbornly recording each moment. The confrontation must have gone on, but soon I was too busy checking Joe's regulators and diving computer to follow its progress. By the time our boat stopped, not even the airship was visible on the horizon.

The rain had stopped, just in time for us to get ourselves wetter still. Paul delivered last-minute reminders, conscientious to the point of aggravation, and then we were in.

Nothing seemed different at first. Indistinct shadows flickered through the gloom, fish shoals playing along the edges of my sight. Joe tugged my arm and pointed. I looked at a fading patch of light the clouds let through, but saw nothing in it.

When the sunlight came again, it moved my way like a rising curtain. The waters cleared before me, then scintillated around me. It seemed I could see to infinity, but my eyes didn't care about such abstractions. They had fixed on *them*.

Jet whales filled the water. Joe and I watched one pass twenty meters to our left, its fringed mouth lunging forward and closing, lunging and closing. Muscular ripples ran the length of its body, building to a final expulsive spasm at the tail. I felt the whole ocean shudder at its passage.

Others were whooping into their suit mikes, and swimming hard to get into position behind the schools of lesser fish. Those fish were themselves moving, trying to avoid the advancing maws. I made sure to steer clear of fish and whales alike, adding my own variation to this three-way dance.

Paul was in first, hitting a jet whale two gulps past tearing through a shoal of puggies. I followed the undulations under its skin, and released an unconsciously held breath when he emerged. His brother looked more excited at the feat than he, and began maneuvering for his own run.

I glanced away from them, to find a whale bearing down on me. I kicked myself out of its path, then just watched in awe.

It loomed over me, powerful and im-

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mense, pulsing like a heart. It moved with the irresistible force of life, stronger than nature, mightier than ambition, loftier than pride. One of its tiny black eyes rolled toward me, then languidly turned forward again. *Mene, mene* echoed in some cobwebbed nook of my brain.

Then it was past. The wake of its passage, a good five meters away, tugged and almost spun me. I righted my body, but my mind still bucked and eddied.

In a moment of clarity, I could see why the Adaptionists wanted our hands off them—and I could imagine why the jet-divers offered themselves to its gorge. The moment faded, leaving but the shadow of that knowledge, something that defied words. I despaired of being able to tell others. They had to *see*.

All that rescued me from rapture was the nagging mind-voice of Paul Golba, the call of responsibility. I used depth checks, tank checks, any routine to keep myself from fading into that overwhelming wonder again.

My companions were immersed in joy of a different order. Every few minutes, one would get just the right position, and propel himself through. The chills of fear I felt subsided gradually. Technique and science were on their side. They could impose their will on the creatures—in the most constricted, limited sense.

The professional in me watched for signs of abuse. If you didn't count jet-diving itself, there seemed to be none. The whales passed each diver without evidence that they even noticed their presence. If the chemoreceptor chemicals had any ill effects, they didn't show externally. The divers followed all the other rules scrupulously, except the one that was their reason for being here.

An hour passed in a flash. We could easily have stayed down another two, but Paul's muffled, reedy voice told us otherwise. From what I could gather, Adaptionists were finally converging on our dive site, from north and south. The cool ocean would soon be too hot to hold us.

Joe and I surfaced slowly, carefully, making our safety stop at five meters. Ahead of us, Jim looked to be making one last try. He had had no luck the whole dive, always finding himself in front of calves or small cows, never in position for one of the larger ones that self-preservation demanded. I heard Paul's voice calling after him, but Jim either didn't answer, or had turned off his intersuit system.

He spied the bull jet a quarter-kilometer off, bearing down on some grayflukes. Jim kicked off toward it. Luck seemed to desert him again, as the whale drifted off-line. Suddenly, with a deft twist of its body, it curved Jim's way again. He had caught Fortune's eye.

I watched the whale engulf him. Its rhythm caught, then picked up again. For a second I wondered why it had done that—until I remembered seeing those same hesitations as they passed through shoals, gulping down fish.

"No!" I shouted, bubbles pouring out of my mouthpiece. I began diving to intercept the whale, but Joe held me back. I could only watch as it slipped beneath us, its rhythm again regular, water and only water shooting from the outlet of its great throat.

Paul was swimming frantically toward us, in a shallow climb. Even in his moments of starkest horror, he still remembered to avoid decompression sickness. He reached the surface right at the boat, and we were seconds behind him.

"Sonar!" he was croaking before he had his mouthpiece out. "Fifteen-meter bull, quarter-klick ahead! Is everyone on board?"

"Wait!" someone shouted, as two last figures clambered aboard. "OK!"

Paul tore off his flippers and ran to the wheelhouse. "Do you have it? Follow it. Go!"

The deck lurched, almost toppling me over. I squirmed out of my gear, and

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joined the growing crowd at the doorway to the wheelhouse. Some were just learning.

"Don't lose it," Paul snapped at Lyss. She bore his vehemence quietly. "Get one of your crew into scuba gear, just in case."

In case what? First stop down the esophagus was the ruminative sphincter. The same crushing muscles, without the insulating blubber. I blanched at the thought.

Joe advanced. "Paul—" Paul waved him away, but he wouldn't go. "Paul, this won't do him any good."

"*I know that!*" His voice cracked, betraying him. None of us made a sound. "But we have to recover him," he said, turning back to the sonar. From his hopeless tone, we all knew what he meant.

I stepped away, turned sternward, and saw the boat. It had come to cut us off from the north; now it was trailing us. Off our bow, the other two also matched our pace.

I went down to the bunks, to retrieve some things. When I surfaced again, some of the divers were already arguing the point I had just thought of.

"They weren't more than half a kilometer away," Jeff was saying, "and the current was toward us, so sure, it could have been them."

"That's too far. Besides—" Dave Christianson moved farther from the wheelhouse, and dropped his already low voice. "—Jim was so small, he could've just slipped down the wrong pipe."

"Oh, that's stupid," Joe said. "Don't kid yourself. We know it was the Adaptionists."

"No, we don't," I said, turning all their heads, "but I intend to find out. I need to know where those water samples the Golbas took are; I need to see sonar records from the moment Jim got swallowed—"

"Hey, we all want answers," Joe said, "but strutting around playing detective won't get any of us anywhere."

"I don't need to play." I flipped out my ID holocard. "Sakakawea Police Bureau, currently detached to the Colonial Authority."

The silence was brief. "Police?" "What's he doing here?" "Were you sent to infiltrate us or something?"

"That's irrelevant now," I said, putting my card away. "As of now, I'm on a murder investigation."

"That is an outlandish allegation, Mister Quinn."

Professor Topa tautly held himself under control. Lyss Mehtz had let me use the wheelhouse's visiphone. I had wanted to see his reactions.

"Why is it outlandish, Professor? They claim Call to Adapt is pouring these chemoreceptor binders into the ocean, and—"

"I doubt you have proof of that."

Interesting wording: 'I doubt.' "The victim and his brother took samples earlier today, and they were also thorough enough to bring a compact chemlab aboard for analysis. I can get proof in a matter of hours, days at the outside if we send them to a regular lab."

I had leaned into the screen, and now backed away. "It's just easier if I get straight answers early on. Does Call to Adapt use these chemicals?"

Topa scowled. "They do, Mister Quinn, but you show yourself woefully ignorant about them. The binder in question is naturally clear, but they add a dye before use. It's meant as a warning and a deterrent."

"Really? I did see that dye. It wasn't exactly a contrasting color, and it dispersed pretty quickly."

"You should expect no less from a group that preaches minimal environmental interference. Have I answered all your questions?"

"Not quite." My eye drifted to the boat tailing us, the one not five hundred meters away when Jim Golba met his end. I had traced Cassidy Nickells there, and she was refusing my calls.

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"Do you know of anyone in Call to Adapt who might kill *in extremis*, to achieve the group's ends?" I didn't call it 'your group.' I had noticed how he had detached himself from them, and didn't want him more defensive than he already was.

"No. Nothing extreme enough has happened for them to contemplate such madness." His composure had begun to slip. "And I begin to doubt again those jet-divers' words. How convenient that those with the most to gain controlled the samples and the means of analysis."

"Professor, you can't—"

"Sooner them than Call to Adapt. You've seen up-close how cheaply they value their own well-being, or that of the jet whales. Have you considered what would happen if one of Mister Golba's air tanks lodged inside that creature's digestive tract, Mister Quinn? Or ruptured there?"

I imagined it briefly, and graphically. "No. I've had other concerns."

"Well, do recall it when composing your report. Good day."

He shut off. Mehtz was at the helm, pretending not to notice, but she did. I walked out of the wheelhouse, into the mockingly bright sunlight.

The worst of Topa's peroration was that he had a point. I had been tough on him; I would have to be tough on everyone. Even Paul.

I got to questioning Paul last. The others had taken him below, to get him away from the newsblimps, three now, blasting questions at anyone on deck. His skin was drained of the little color it had, his body likewise sapped of its energy.

I gently guided him through the minutes before Jim's jet-dive, probing for every action, every word. He interrupted me once with a blank, confused look. "You've been questioning everyone else. Why me, too?"

I rested a hand on his trembling arm. "Eyewitness testimony is notoriously imprecise. The more corroboration I get, the less we have to worry about some court prodding for holes."

There was that, and my need to test his story against everyone else's. Fortunately, it matched in most places. A couple divergences I put down to wishful rewriting of the past. I had seen that enough in survivors to recognize it as an innocent defense mechanism.

He submitted to my locking away his portable chemlab and the samples as evidence. "Whatever I can do," he repeated time and again. He looked more and more like a kid, wounded and alone. He made it tough to be detached.

After more futile calls to Nickells's boat, I phoned in to Supervisor Nguyen on my machine. "What have you been doing?" he growled. "This happens right in the group you're investigating, and I have to learn about it from the news."

I tried not to think of the airships. "I've been investigating, sir. Eight eyewitnesses plus sonar records, ready to upload."

"Upload? Quinn, you have to get that boat back in port, so proper authorities can take over."

Proper, as opposed to me? "That's going to be difficult. We're following the whale that swallowed Jim Golba, so . . ." I glanced around. "So when he's . . . passed, we can recover the body. For his brother's sake."

"What? That is preposterous." His pate furrowed. "But it would be forensic evidence. Fine, but I'm arranging for police boats to join you."

"You'll get no argument here. Stand by for upload."

No sooner had I disconnected the upload pad than the phone chirped. I answered, ready for whatever Nguyen threw at me now.

"Darragh, why haven't you called? Why didn't you tell me?"

I paled. "Moire, I've had work, investigating a suspicious death. I haven't had time."

"Suspicious? He threw himself into a

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whale's mouth, and he got eaten. What's suspicious?"

Presented that way, it wasn't. "Someone has to gather the facts. For now, that's me. I won't be away much longer."

"Don't go down, Darragh. If I mean anything to you, don't go down."

How could I answer that? The lady or the tiger—make that the jet whale. "I've been away too long already. How did the transfer go yesterday?"

Moire nearly softened. "Thanks for asking. It went fine, no complications. I even got to see the tiny little thing after it was attached to the matrix."

"You'll have to show me when I get back."

"I will," she said, eyes dark and hard on me, "so get home."

Nightfall came fast, mercifully closing an appalling day. People ate alone or in small, staggered groups, eschewing an affected mass catharsis for quieter, healing solitude.

I took time to run a small part of one water sample through the Golbas' minilab. The unpronounceable name I had been told to expect was there. I locked the machine back up without much sense of accomplishment, just of time expended.

I watched the broad white wake we cut through dark ocean, not acknowledging the two boats still matching our move. If the newsblimps were still there, following our running lights or tracking us by infrared, I couldn't hear the whir of their engines. I let myself soak in that solitude, but it had no healing balm for me.

Lyss was in the wheelhouse, unmoving but still chafing. Paul stood intent on the sonar display, eyes locked on one bright sausage shape dominating the display.

"Captain Mehtz can handle the pursuit, Paul," I told him mildly. "Go below and get some sleep."

Paul looked up at me. He wasn't as guarded as others were in the wake of my badge-flashing. His eyes flitted around, me to Lyss to me to somewhere else. "It's . . . no trouble . . ."

"You'll be no use to anyone strung out and asleep on your feet. Let Captain Mehtz do her job. If it helps, I'll take over the sonar watch."

He blinked sightlessly. "Thank you." He stood, looked around in confusion, then said "Thank you" again and left.

I eased myself into the sonar chair. "Poor kid," I said.

"Twenty-five Earth years is no kid," Lyss responded. "And not even I go around calling myself Captain Mehtz."

"Paul needed the reassurance of authority. Otherwise, he could have stayed here all night."

She cocked her head. "In that case, I'll accept the title. Just this once." She smiled stiffly. "Any progress with the investigation?"

"Some," I lied. I had no firm evidence to implicate the Adaptionists, even if Topa had seemed anxious that one of them had gone off half-cocked. There was less evidence pointing to anyone else. "Maybe Moire was right, though. Maybe their luck just ran out."

Lyss's mouth curled sadly. "It had to happen sooner or later."

"I suppose so. When the police boats join us, they'll be able to close this case." I rubbed my eyes, then grimaced. "Sorry to be boring you."

"You're not boring," she said. "Today has been anything but boring."

"Yeah." I stared off, into the water. "I wasn't prepared, you know. For how . . . primeval those creatures are. Immense and transcendent and . . . so much beyond the mundane."

I took her silence for receptivity. There was so much I needed to express.

"I was young when I arrived on Niya—lots of us were. I was so convinced that being among the first to live on this world made me special somehow. I was certain I'd do something extraordinary with my life, to fulfill that promise.

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"Well, I haven't, but I kept thinking I could break free of my mundane life, sometime, somehow. After today, though—after seeing a jet whale surge past me so close I could nearly touch it—I feel humbled in ways I cannot begin to explain. I feel imbecilically arrogant; I feel like our whole race is imbecilically arrogant. I guess I'll get over most of that feeling in a day or two. Not all, I don't think. Not all."

As I listened to the motor, to the water cleaving from our bow, I snickered. "I bet you hear overwrought soliloquies like that all the time from your customers."

"Maybe not as eloquently. And this is only my second charter for jet-divers. Could be the last, too."

I nodded at that. The divers would probably recover and want to try again—most of them. With a death this dramatic, and this publicized, the public might not let them. A wave of emotion could easily sweep a ban into place. I wondered if the Adaptionists would be satisfied to win the battle on grounds not of their choosing.

Lyss and I were soon talking about lots of little things. I needed the chance to interact, and to pretend to forget what happened to Jim. Lyss seemed to have the same need.

My hindbrain kept telling me this was dangerous, that I had a wife, and a child in the tanks so young it didn't have a sex yet. I accepted the danger gladly. It was something I could control, turn off before it really did become perilous. It was my version of jet-diving, except that Lyss was no threat to devour me alive.

After an ungodly long stretch of talking, I barely remembered what had started us. Lyss broke the spell with a reminder. "When are those police boats you mentioned due?"

"No idea. Maybe if I saw a chart, I could make a guess."

"Doesn't matter. We can try without them."

My head came up. "Try what?"

"A dive. Jet whales have a certain regularity to them. There's a good chance ours will defecate before it really gets underway for the day. If we're in at daybreak, we'll have a chance of catching something."

"You make it sound so glamorous. But wait, you said this was only your second charter."

"For jet-divers, yes, not jet-watchers. Besides, I pick things up quickly, once I know what to look for."

"Less than twenty-four hours, though. Do they digest that fast?"

"Nobody knows. We'll just have to see what passes." We both groaned at her horrible joke. "If nobody else volunteers, I'll join you on the dive."

"Thanks. I appreciate that." I looked at the sonar, at the bright shadow dominating it.

She tapped my shoulder. "If you're diving early, getting some sleep is a good idea."

"I'm not tired. Besides, I told Paul I'd watch things for him."

"The nav computer can follow our beast as well as a human, especially now."

The whales cruised at thirty kilometers an hour, and sprinted to fifty, but they slowed almost to nothing at night, enough to keep water flowing past their inner gills. She was right, but I still felt a duty.

"Darragh, don't make me dust off my 'Captain Mehtz' hat."

I couldn't parry that neatly stolen thrust. "I wouldn't dream of it," I said in retreat. "See you tomorrow."

"Early tomorrow," she said, giving me one last shoo out the wheelhouse door.

I anticipated a dreadful lot of tossing and turning, but once my head hit the pillow, not even the snores around me could keep me awake.

I awoke before six, and stole out quietly to get my wetsuit on. I must have bumped around more than I thought, because Joe Weber came peeking in,

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sleep still hanging on his eyes. "Whutzis?"

"Lyss says we might be able to recover something this morning. Care to come along? I can always use another buddy."

Joe backed off a step. "I—after yesterday, I'm—not ready to go down again. Not yet."

I couldn't blame him. Sadly, I couldn't emulate him, either.

After a trip to the equipment locker, I met Lyss on deck. We needed bulbs to see properly, as dawn was still some time away. We traded off equipment for checks and double-checks, tests and maintenance.

I hesitated once or twice while examining her tank harnesses. I thought of our long talk, wondered whether I should deny any guilty intentions. I might end up creating concerns and discomforts that hadn't been there.

"Darragh?" Lyss dropped the swab she had used to wipe out my mouthpiece exhaust into a wastebin. "Not quite awake, are you?"

"Sorry. My brain took a vacation and left me behind."

"About the dive, we should try to keep a good distance between us, to cover more water. Who's to say when our whale will have its discharge, and if it gets ahead of us, we're not likely to catch up."

"I don't know. Separating diving buddies defeats the purpose. Maybe we can get more—no, probably not. Guess we've got no choice. So, wristcomp strap, check . . ."

By the time we finished off a bottle of Depropal between us, the sun had peeked over a cloudless horizon. I gave my mask a good antifogging spray, joined Lyss at the side of the boat, and followed her in.

If I had been asleep before, the chill of the water woke me up for good. The *Mehtz-o-Soprano* had moved ahead of our quarry in the night, and I could see it a hundred meters behind us, making little lurches.

Lyss kicked away to keep ahead of it, while I circled around, net-caster ready, to try and snare anything that looked like it might once have been Jim. I took in the other familiar denizens of the ocean one by one: puggies and weavers, broad yellowish clouds of brineleaf, and deep in the distance, other whales starting to move.

I flinched at a twinge behind my eyes. The subsonics again. Did the Adaptionists have no decency? Worse, did they think *we* had no decency?

I felt the water tremble. The whale before me yawed, its mouth gaping. For an instant, I glimpsed inisde, saw gills and rakers—and hundreds of tasting tendrils. I swam under its guard, taking away its prospective angle of attack. It abandoned any designs it had on me, and began pulsing forward.

I had to swim hard to match its still languid pace. I watched its tail end for any sign of excreta, without result. Far ahead I could see Lyss, turned back to watch me, or the jet whale, as she swam.

So intent was I on this whale, I almost never noticed the cow bearing down on me. I swam away hard, into my quarry's wake. It couldn't possibly follow me there.

It did.

I plunged downward in desperation. A vortex of water snatched at me, then the fringe of the cow's spreading mouth grazed my foot. I tumbled away, bumped once more by its passing flank.

When I stopped spinning, I barely knew where up was. A jab at the keypad on my wrist gave me a mask display, but numbers didn't help. I looked around for references—and found a monster.

It was the largest jet whale I had yet seen, eighteen meters long if the reach of its maw was any indication. Its path took it below me—until it bowed itself upward, and surged my way.

I knew that instant I couldn't avoid it, even as my legs flailed to carry me away. I was doomed . . . but how? Possibilities

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flashed through my head—and I clutched at one. No more plausible than any other, but only it gave me a chance.

My chest strained with held breath. I spun around, driving myself at the advancing behemoth, resisting the rising urge to gasp out. My life might be worth that one breath.

The mouth opened like a blooming flower, lunged shut, then opened again all around me. Suction bucked me, but I held myself straight. I could see far down the throat before me, revealing itself with its driving undulation.

Then all the light went out of the world.

I felt nothing for a second except the water moving with me, and scrapes from the mesh of rakers I passed through. I reached for the top of the throat, recalling Paul's training by pure instinct. My fingers grazed something, but I lost it as flesh closed around my legs.

In an instant blubber pressed all around, as the muscles underneath kneaded me. I fought to hold my breath, fought the whole force of the whale as it crushed down upon me.

I reemerged into a water pocket, my lungs screaming. Not yet—but how much longer? I felt for the roof, found it, and ran my hands flush along it. The instant I considered that this might retard my progress as it made it notionally safer, the throat closed around me again.

A wave of contraction broke my control. My breath came out, spilling along my neck. I greedily drew fresh breath, even as I despaired. So close . . .

And with one last great squeeze, I reemerged. I took a second to realize what had happened, but it was a lot of realizing.

Everything they said about it was true. *Sterbe und Werde*. Death and rebirth. Nature had me in its power, and still I lived. It had been the most—I could only find one word large enough—*real* moment of my life.

I almost whooped with exultation, but caught myself. My breath was still dangerous. Worse, my would-be killer was still out there.

The *Mehtz-o-Soprano* was ahead and above, with a small figure swimming for it. She didn't see me. Hoping it would stay that way, I shot off in a climb, straight for the boat.

A warning voice sounded in my ear, and my buoyancy bladder deflated rapidly. I jabbed at my wristcomp, turning off the failsafe, and reinflated the chamber by hand. Decompression wasn't my worst worry right then.

Mehtz never saw me, but she climbed out of the water with incautious speed. Meters away from the boat, I saw water begin to churn from the engine.

I grabbed the net ladder along the side, hanging on as the boat throttled up hard. Half of me trailed along in the water, bumping and jerking me, threatening to rip me away. I shouted, spat out my mouthpiece and shouted again.

The engine noise rose into an unnatural roar. She was overdriving, fleeing the scene of the crime. I reached for another loop of netting, and almost fell away. Spasms of decompression pain bored through my elbows, and my gut began kinking.

I hung on, waiting for another chance. My hand went up feebly, groping—and another hand clasped it hard. I almost fought, fearing being cast off, until I saw Paul's drawn face over me.

Together, we manhandled me up and over the side. My knees screamed, my stomach rolled, but I made myself stand and shed my flippers. We joined three others at the wheelhouse, as I felt the boat's speed ebb away.

"You almost left him behind!" Paul shouted as he drove through the others, right into Lyss's face. "How could you do that?"

I caught her eyes. She tore away to look at Paul, before her nerve failed. "I saw him be swallowed, and he didn't come out. I—I wanted to follow the beast that got him, to—to—"

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"You wanted to put on an act." I advanced on her, barely steady. "A second act for your audience. You didn't intend to look back, see whether I emerged. You expected me to be dead. You had arranged for it."

There were exclamations. Lyss began losing color. "Darragh, I panicked. I'm sorry, terribly sorry, but don't leap to vindictive conclusions."

I suppressed a violent urge. "You're right," I said coldly. "I should have proof before making accusations." I made a show of detaching my mouthpiece regulator from its air hose. "Would anyone have some cleaning swabs handy? I need to take a sample."

Lyss threw herself at me, clawing for the mouthpiece. She almost tore it from my grasp before three men, including one of her crew, pulled her away.

I looked at her, straining against their holds. "Should I consider that a confession?"

"You're setting me up!" she shrieked. "Don't think I don't know. You could falsify whatever evidence you liked with that toddler's chemlab. No court will accept it."

A harsh blare carried toward us from starboard aft. I didn't need to look: I recognized the sound of a police boat horn. "No problem. Someone more impartial will have their crack at it. That should satisfy you."

I left the wheelhouse, but was pelted with questions. "What's on the mouthpiece?" was asked over and over.

"My guess is, the same chemoreceptor binder the Adaptionists dump to flush you out. My own breath dispersed it into the ocean, and the jet whales could smell me a kilometer away."

"Why in the mouthpiece?" Joe asked. "Why not sabotage your Depropal instead?"

"Because that would be too obvious. It's the first thing someone would check. She made sure we shared a bottle, to give herself an alibi, but when she swabbed this—" I hefted my mouthpiece. "—I'm guessing she was putting in more than wiping out."

"But how can you know it's the mouthpiece?" Joe wondered.

I smirked. "Because I'm alive. Holding my breath before the whale swallowed me was the only chance I could see of saving my life. If it had been anything else luring it, I'd be dead."

Mark Wentz breathed a curse. "It could have been any of us."

"No, she wanted me dead, to further discredit jet-diving, and wreck the investigation. Maybe she did panic in that way. As for Jim, choosing him had to be deliberate. His suit was smaller than anyone else's. Presumably she swabbed his exhaust beforehand, and he didn't clean it out enough to—"

I had said too much. Paul was there with us, finally seeing the full truth he could deny before. He stalked back toward the wheelhouse. "You killed him. My brother, you killed him!"

I got my arms around him, but a convulsion through my abdomen broke my control. I crumpled, vomiting. In a heartbeat, Paul was kneeling at my side. "He's got decompression sickness. Quick, unsuit him and get him below."

He was right, but it was the last pang of a mild case. Some time later, one of his colleagues accused me of faking the seizure, to rouse his natural safety reactions and stop him from making a murderous attack on Lyss Mehtz.

It would have been brilliant of me. I wish I were that clever.

"I'm not sorry he's dead. I'm definitely not sorry that liar Quinn almost died, either."

So went Mehtz's statement the next day, which I watched remotely from the office in Sakakawea. Still protesting her innocence, she could not resist declaiming her motive.

"It's primitivism, an indulgence in sheer male primitivism. They exalt their physical bravery, and it's no surprise

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they do it by violating a vulvar symbol. You can't listen to them for one night without being revolted.

"And it's obvious where they see this taking us. It's given them a sick fixation on the physical birth process. They play psychologist, saying that ecto-gestation has somehow diminished us. Those people, those Golbas especially, they want women enslaved to their uteruses again.

"I almost wish I really had killed Jim. It would have been a blow against subjugation. Maybe exposing them this way will do as much good. I can hope—the same way I can hope the truth comes out, and I'm found innocent."

She could hope for eight days. It took two for Jim's whale to finally give up the evidence, and six for a robotic submersible to retrieve it from the sea bottom, two kilometers short of the plunge off the continental shelf. The mouthpiece was mangled, but still carried a trace of chemoreceptor binder. Even in the turbulent atmosphere Mehtz had stirred up, a jury should have no problem.

The background check on her came up clear: no connection with Call to Adapt. They barely broke stride, now contending that jet-diving was too provocative an act to allow to continue. They received a fresh infusion of members, most of them championing Mehtz's agenda. Like an air tank in a jet whale's stomach they so feared, it might blow Call to Adapt apart any time.

But they aren't my concern any more.

Nguyen almost hit the roof when I told him. He almost hit *me*. "What do you mean, recusing yourself? You can't quit the assignment."

"I have to. I can't be impartial about it any longer."

Nguyen glowered down at me. I stayed calmly seated. "What Mehtz tried to do has no connection to investigating cruelty to native species."

"That isn't why I'm dropping the case. You've read my Mehtz report. You know I ended up going through a jet whale." I shuddered unwittingly.

"Don't tell me they've converted you."

"They haven't . . . or maybe *it* did. What I mean is, after my experience, I can't blame anyone who would want to try it. I can't stand in their way. That's why I can't deliver an unbiased report. You have to accept that."

"I do not, Dar. Get over your emotional fixations and do your work, or I'll—"

"Fire me?" I said, standing to match him. "The hero of the hour?"

"You got that right: the hour. Get out of my office, and come back with a report I can send to the Plaza, or don't ever come back."

I almost took his offer. Sometimes I wish I had. Instead, I composed a succinct report that night, praising the divers' conscientious precautions, and finding no cause to restrict or ban their practices.

Nguyen accepted the report with a fierce grin. No matter that my finding probably went against what the Plaza wanted to hear, or that I might be thoroughly biased. I had done as he demanded, and that sufficed for him.

It won't suffice forever. I have standing job offers from the bureaus in Oahe Harbor and New Cheyenne. I'm preparing Moire already. Once our child is decanted, Nguyen can smile at my resignation letter all he wants.

She screamed at me for going into the water again, for almost getting eaten. I expected it. It wasn't even about losing me: it was about losing *us*. It had been all along.

Moire's not going to lose us, the three of us. (I keep telling her it's a boy, but she doesn't see it yet.) We'll have a fresh start, in Oahe Harbor I think. I owe it to Paul to be around for him, after what Mehtz did under my nose.

It won't hurt to be close to the migration route, either. Not that I'm going jet-diving again. I'll be content to watch from a safe distance. Once through is plenty for me.

For a while, at least. □

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WHAT WE DON'T UNDERSTAND

At the end of 1998 my wife, daughter, and I attended the Renaissance Weekend at Hilton Head Island, South Carolina. That gathering is an invitation-only assemblage of politicians, pundits, writers, academics, media people, and others including the First Family. It has been described as the world's best new year's party.

Programming at the Renaissance Weekend is rather like that of an upscale science fiction convention, except that the panels have far more participants than SF con panels, with each panelist allowed only a five-minute "sound bite" to describe his or her take on the subject under discussion. On a panel about science and technology I used my few minutes to describe the big unsolved problems in physics and astrophysics. This strategy worked well and stimulated considerable interest and many questions during and after the panel.

An investment banker told me later that he was surprised to learn that science had so many unsolved problems. He had been under the impression that in science we understood almost everything, with only a few odds and ends to be cleaned up. This opinion, held by many otherwise well-informed people, reflects the assertions recently proclaimed by an editor of a prominent science magazine. His book claimed that we were at the end of science, that we had solved all the big problems, and what remained was to work out a few details. The author of that book seemed unaware of most of the problems on my list.

So here's my list of the top seven unsolved problems in physics and astrophysics.

Problem 1—Vacuum Energy and Dark Matter in Cosmology. Everything we thought we knew about the universe is wrong! In the past year astronomical observations of type Ia supernovas have led to the conclusion that the universe is not only expanding and will expand forever, but also that it is *accelerating* as it expands, with a long-range "antigravity" repulsive force driving its expansion. (See my column in the May, 1999 *Analog*). The current explanation for this observation is that about 3/4 of the energy from the Big Bang is not in the form of matter but in the vacuum itself and that this vacuum energy is creating a negative pressure that accelerates the expansion of the universe. So the bookkeeping seems to be that about 70% of the energy in the universe is in the vacuum, about 5% is in the form of normal matter (protons, planets, stars, galaxies, etc.), and the remaining 25% is "dark matter," mysterious invisible particles that inhabit the haloes of galaxies.

This new understanding raises far more questions then it answers. Why and how does the vacuum store energy? What is the dark matter? Why is the energy from the Big Bang distributed in this particular way? Is the energy in the vacuum constant with time, or is it changing? Could the vacuum suddenly decide to dump its energy and restart the Big Bang? And so on.

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The universe is a stranger place than we had imagined.

Problem 2—The Arbitrary Parameters of the Standard Model of Particle Physics. The standard model of particle physics, which is called quantum chromodynamics or QCD, is in many ways an excellent theory. It is in good agreement with essentially all of the data collected by particle physics experiments during the past decades. Yet in another way, it is unsatisfactory. It fails to provide a deep understanding of the inner workings of the universe. Instead, it depends on about two dozen arbitrary parameters, for example the masses of quarks and leptons, the strengths of the fundamental forces, and the strengths of interconnections between particles. Some of these parameters are set to zero, while others have definite values that must be derived from measurements. We have no idea where these parameters come from or how they are related to each other. We are confident that there must be a better, more fundamental theory behind this façade. So far, however, we have been unable to make the Standard Model "break," to find places where its predictions conspicuously fail, to find a crack in the brick wall which might provide some inkling of what lies behind it. (See my column in the November, 1997 *Analog*).

A new higher-energy particle accelerator, the large hadronic collider or LHC, will begin operation at the CERN laboratory in Geneva around 2005. It is hoped that this machine will provide clues to the underpinnings of QCD. But there are no guarantees, and it is not clear when or how we will be able to go beyond the present impasse.

Problem 3—The Origin of Gamma Ray Bursts. Gamma ray bursts were discovered 32 years ago by accident. In 1967 the United States entered a treaty that banned the testing of nuclear weapons in space. To verify that the terms of the treaty were being observed, in the late 1960s Los Alamos Laboratory and the Air Force launched the VELA series of surveillance satellites. The VELA satellites never detected a nuclear explosion, but from the time when the first VELA probe was activated bursts of gamma rays were detected every few days. The intelligence analysts were baffled and suspected satellite malfunctions or some form of deliberate jamming to hide real tests. Finally, when several satellites were in orbit simultaneously it became possible to triangulate on the radiation. It was discovered that the bursts came from outside the solar system. (See my column in the October, 1995 *Analog*).

During the last decade using space-based detectors, particularly the BATSE experiment on NASA's Compton Gamma Ray Observatory satellite, over 2,200 gamma ray bursts (GRB) have been recorded and mapped. Since 1997 astronomers have been able, within about 1 day after the burst, to point their optical, X-ray, and radio instruments toward observed GRB positions and to observe the "afterglow" from the bursts. According to Doppler-shift measurements of spectral lines, the optical afterglow comes from dim galaxies 10 to 12 billion light years from Earth. At such distances, a non-beamed gamma ray burst would require an energy release at the source of about 10^{44} joules, roughly 47 times the energy you would get by converting the mass of the planet Jupiter completely into energy.

It remains a deep mystery what astrophysical catastrophe could have released so much energy, how the process takes place, and why so much of the energy ends up in the form of gamma rays.

Problem 4—The Origin of Ultra-High Energy Cosmic Rays. The most energetic particles ever observed come not from large particle accelerators but from the cosmos itself. These particles from space, usually protons, have energies up to 10,000,000 times higher than the most energetic protons we can pro-

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duce with accelerators. The most energetic cosmic ray particle observed up to now, which was recorded at the Fly's Eye detector in Utah, had a measured energy of about 3×10^{20} electron volts or 50 joules, roughly the kinetic energy of a baseball thrown at 60 mph.

The existence of such ultra-high energy (UHE) particles creates a problem. They should not be able to reach us. The universe is permeated with cosmic microwave background radiation, low energy photons released about 500,000 years after the Big Bang when the protons and electrons paired off and matter and light went their separate ways. Protons with energies above about 5×10^{18} electron volts, on colliding with these photons, should produce pi-mesons and should rapidly lose energy. This process, called the GZK cutoff, should result in a sharp drop in cosmic rays above 5×10^{18} electron volts. (See my column in the January, 1996 *Analog*).

Paradoxically, instead of a cutoff, *more* cosmic rays are observed above this energy than extrapolation from lower energies would predict. The only plausible resolution of this paradox is the assumption that these UHE particles are being produced relatively close to the Earth, within about 160 million light years, which would place their source within the Local Group, i.e., in our galaxy or one of our near galactic neighbors. Yet there are no known objects in the Local Group that might produce such energetic particles.

It has been suggested that there are some very heavy particle-remnants left over from the Big Bang that are now decaying to produce the observed UHE cosmic rays. Clearly more detection data is needed, and experimental astrophysics groups, including my own at the University of Washington, are designing new distributed detectors to gain more information about this mysterious phenomenon.

Problem 5—The Solar Neutrino Problem. A growing body of evidence indicates that only about 1/3 of the electron neutrinos expected from the best models of the fusion reactions in our Sun actually reach the Earth to be detected. The first evidence of this began to emerge 30 years ago, when the detector in the Homestake gold mine went into operation. The neutrino deficiency was later confirmed by the Kamiokande II detector in Japan and by the SAGE experiment in Russia and the GALLEX experiment in the Mont Blanc Tunnel which connects France and Italy. (See my column in the September, 1992 *Analog*).

The alternatives are that either the Sun is making less neutrinos than the best models predict (perhaps because the Sun has gone out inside and we haven't noticed yet!) or because some physical process is interfering with their detection. The neutrino oscillations recently detected between mu and tau neutrinos by the Super Kamiokande detector cannot explain this problem, which involves a deficit of electron neutrinos.

Physicists hope that the new heavy-water-filled SNO neutrino detector, which will go into operation deep in a mine in Sudbury, Ontario, Canada, should provide new insights into this long-standing problem.

Problem 6—The Origin of Matter/Antimatter Asymmetry in the Universe. It is now clear from astrophysical evidence that the universe is dominated by matter, even in very distant regions. There are far more electrons than positrons and far more protons than antiprotons in our universe. There is no hint of antimatter stars or galaxies.

From the viewpoint of particle physics, this is a problem because at the particle level energetic processes normally produce matter particles and antimatter particles (e.g., electrons and positrons) together, so that the balance between matter and antimatter is pre-

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served. The only known exception to this is the so called "CP Violation" that has only been observed in the decay of K^0 mesons (the matter-antimatter combination of a strange and a down quark). This decay exhibits a matter/antimatter asymmetry. (See my column in the September, 1988 *Analog*). However, this process could not have caused the universe's proton excess because the K^0 has only about half the mass of a proton. Therefore, the matter/antimatter asymmetry remains a major unsolved problem of particle astrophysics.

However, new clues to the puzzle may be coming. The Department of Energy is constructing a new kind of accelerator, a "B Factory" at the SLAC Laboratory in Palo Alto, California. The B^0 mesons it will produce, matter-antimatter combinations of a bottom and a down quark, are expected to exhibit CP violations similar to those of the K^0 mesons and to provide new insights into Nature's preference for matter over antimatter.

Problem 7—The Origin of the Arrow of Time. In the everyday world it's clear that the past and the future are not the same. We remember the past but not the future. We can send radio signals to the future (e.g., to a distant star) but not to the past. Isolated systems have lower disorder in the past and become more disordered in the future. The universe was smaller and hotter in the past but will be larger and cooler in the future. The K^0 meson has decay probabilities that are larger for the normal decay process than for the equivalent time-reversed process. These different manifestations of an asymmetry in time are called, respectively, the *subjective* arrow of time, the *electromagnetic* arrow of time, the *thermodynamic* arrow of time, the *cosmological* arrow of time, and the *CP-violation* arrow of time.

These time arrows are all related to one of the most fundamental and mysterious laws of physics is *the principle of causality*, the rule that a cause must always precede all of its effects in any reference frame. No violation of causality has ever been observed, but it is not clear where causality comes from or how it is imposed on the universe.

This fundamental question can be approached by asking how the different time arrows are related and which arrows cause the others. It is generally accepted that the CP-violation arrow is probably primary, in the sense that if it did not exist the universe would be time-symmetric and contain equal quantities of matter and antimatter. The CP arrow probably leads to the cosmological arrow, making possible the Big Bang and its aftermath.

Beyond this point, there is no consensus. One view is that the cosmological arrow causes the thermodynamic arrow, which in turn causes the electromagnetic and subjective arrows. The other viewpoint, which I have advocated in several papers, is that the cosmological arrow causes the electromagnetic arrow, which causes the thermodynamic arrow, which in turn causes the subjective arrow. The issue is not resolved, and there are few experiments that can shed light on the dilemma. We simply do not understand the origin of causality and the arrows of time that underlie our thinking and existence.

Other scientists might add other scientific problems to this list, which represents only my own priorities and interests. I'm confident that in 10 years we will have understood most of the items on my list, but others will replace them. That's the nature of science. It's clear to me that we are not at the pinnacle of science, but only on a ledge well below the summit, and that we must scramble very hard, with all the intellectual tricks and technological tools we can muster, to make it to the next ledge up. It will be fun to watch, and even more fun to do.

And remember, it's what you don't understand that can kill you.■

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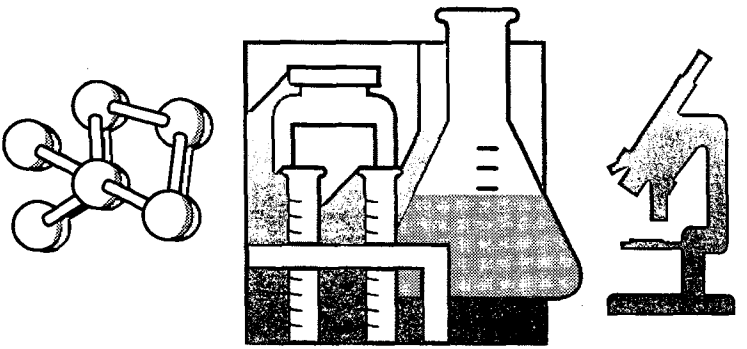
THE ANALYTICAL LABORATORY



Our sincere thanks to all of you who voted in our annual poll on the previous year's issues—your most meaningful form of positive reinforcement for the authors and artists who do an especially good job of entertaining you. Your votes help your favorite writers and artists by rewarding them directly and concretely for outstanding work. They help *you* by giving us a better feel for what you like and don't like—which helps us know what to offer you in the future.

We have five categories: novellas, novelettes, short stories, fact articles, and covers. In each category, we asked you to list your three favorite items, in descending order of preference. Each first place vote counts as three points, second place two, and third place one. The total number of points for each item is divided by the maximum it *could* have received (if everyone had ranked it #1) and multiplied by 10. The result is the score listed below, on a scale of 0 (nobody voted for it) to 10 (everybody ranked it first). In practice, scores run lower in categories with many entries than in those with only a few. For comparison, the number in parentheses at the head of each category is the score every item would have received had all been equally popular.

NOVELLAS (2.00)

1. "Aurora in Four Voices," Catherine Asaro (3.53)
2. "The Ice Dragon's Song," Bud Sparhawk (2.79)
3. "Wrench and Claw," S. D. Howe (2.74)
4. "Tourist Sam," Ben Bova (2.17)
5. "Ashes to Ashes," Grey Rollins (1.97)

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NOVELETTES (1.00)

1. "Zwarte Piet's Tale," Allen Steele (2.07)
2. "Olympus Mons!," Bud Sparhawk (1.75)
3. "Trade Warriors," F. Alexander Brejcha (1.48)
4. "The Question," Ben Bova (1.45)
5. "A Life on Mars," G. David Nordley (1.32)

SHORT STORIES (0.65)

1. "Moon-Calf," Stephen Baxter (1.32)
2. (tie) "In Space, No One Can Hear," Michael A. Burstein (1.13)
   "Spindown," Wolf Read (1.13)
4. (tie) "Artifacts," Jerry Oltion (1.02)
   "Nor Through Inaction," Charles Ardai & Michael A. Burstein (1.02)
   "Sam Boone and the Teacup Conundrum," Bud Sparhawk (1.02)

FACT ARTICLES (2.00)

1. "The World's Simplest Fusion Reactor," Tom Ligon (3.50)
2. "Pathfinder Journal: Adventures in the Mars Business," Geoffrey A. Landis (2.89)
3. "Near-Term Nanotechnology," Stephen L. Gillett, Ph.D. (2.78)
4. "Sex in Space: The Fantasy and the Reality," H. G. Stratmann (2.23)
5. "Biological Hazards and Medical Care in Space," H. G. Stratmann & G. David Nordley (1.82)

COVERS (1.82)

1. July/August (for "The Ice Dragon's Song"): Bob Eggleton (3.52)
2. October: Mike Carroll (2.39)
3. May: Ron Walotsky (2.36)
4. December (for "Aurora in Four Voices"): George Krauter (1.67)
5. June (for "Spindown"): Wolf Read (1.61)

All categories had clear first-place winners this year, but some strong runners-up—including both a two-way and a three-way tie among short stories. Bud Sparhawk managed the unusual distinction of placing a strong second in two categories, while Wolf Read made a good showing in two very different ones: one for writing, one for art.

As always, since Anlab votes are so useful to everyone concerned, we hope to get even more votes next year. Use email or "snail mail," whichever you prefer, but please vote! (And please be careful to vote in the right category, as listed in the annual Index. Every year a few votes are wasted by being cast in the wrong category, and those simply can't be counted.)

Tina Vozick, of White Plains, New York, is this year's winner of a free one-year subscription in a random drawing from all ballots received. Next year that could be you—and the more votes we have, the more the results mean!

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Illustration by Randy Asplund-Faith

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Rajnar Vajra

E-MAGE

When a problem is really big, direct analysis of the details may not be the way to go—if you have an alternative.

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My bills were paid to the end of the month—hallelujah!—and there was abundant junk food in the fridge. So when someone knocked on my door in that tentative fashion which says client rather than salesperson, Jojoba's Witness, or landlord, I got excited.

If some quick money sprinted my way, it could be squandered on something more fun than the utilities or frozen peas. Maybe that Iomega tera-gulp-drive I'd had my eye on . . .

None of my uncle's illegal equipment was poking up from the strategic debris so I yelled, "Come right in, door's not locked."

It was seldom locked. In this neighborhood (not hell, but you can smell it from here), a locked entrance proclaims there are vulnerable people or valuables inside; so my trick is to post "armed response" stickers, put convincing bullet-holes in the wall opposite my doorway, leave the door unbarred, and sink my good stuff in a sea of garbage.

With barely decent haste, I uncovered my work terminal and punched it into active mode. With my other hand, I lit a fresh stick of sandalwood incense. One look sent my dog, Little Mo, scurrying off to the bedroom. I needn't have rushed. Nothing happened for so long, I got tempted to ignore my bad knees and leap up to and pull the procrastinator inside by force.

Finally, two strangers sidled nervously through the trashy high-tide and stood next to me blinking and squinting, struggling to pierce the sweet smog. The glare of my big, wall-mounted video membrane made the air even more opaque, transforming tendrils of incense-smoke into glowing tentacles.

As for me, it takes more than a little fug to screw up *my* vision. Besides, my visitors radiated desperation as vivid as a searchlight.

Married but not newlyweds, I guessed. The woman was pretty and trim and freckled and a pinch older than me, perhaps matching my computer monitor by being twenty-five. Years, in her case, not inches; she was of "normal" height—although compared to me she was a giant. The man was cute, blond, very tall, and looked twenty at most, even with no-sleep bags under his eyes. He kept wiping sweat off his upper lip.

The curtain was up and I was putting on a show.

While I looked the prospective clients over, my fingers were typing two hundred twenty-two words per minute of genuine C-Quadruple-Plus code which I'd memorized for the purpose.

Two purposes, actually. For most people, it silently advertised my expertise. Equally important, if I looked busy, no one would expect me to stand up and shake hands. So new clients would swallow my competence before getting turned off by how short and young and female I was.

Here we be, ladies and gendermen, in the third decade of the twenty-first century and American society is as size-ist, age-ist, appearance-ist, anthropocentric, racist, and sexist as ever. Even here in supposedly cosmopolitan Detroit. Ah well, our species is still very young as species go, maybe someday we'll actually grow up . . .

Grow up! Would you listen to me? Even *my* metaphors are size-ist, and I'm only two and a half inches from being classified a freaking midget!

"Are you . . . you must be Sharon Peabody?" The man observed.

"Who the hell gave you *that* name," I snarled, still typing like an Alternative American Standard Keyboard whirlwind.

"Uh, this superhacker we met at a computer swap-meet. We went there . . . looking for advice."

"Superhacker. Might you be more *specific?*"

"Well . . . he was skinny, had a droopy moustache like Buffalo Bill. Called you a genius and a 'free-lance heroine' when it

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comes to computer crimes. Said you salvage lives and money on, uh . . . 'spec.' God, I hope it's true!"

"Long thin hair at the sides, but Mr. Scalp on top?"

"That's the guy. Said he was 'Grim,' but we're not sure if that was his name or a mood."

"Last name. His first happens to be Herman. Next time you see him, be sure to call him Herm; he loves that. And yes, I work on contingency. Sometimes. I can't give you an estimate until I know the score but I'll try to be reasonable. Meanwhile, I'm 'Emagia' to you two or 'E-Mage' if you want to get formal. You see, in here," I tapped my camouflaged CPU, "I'm a *magician*. Anyone who tries Sharon on me better move quick. Are we on the same home page?"

"Whatever you say . . . Emagia. I'm Brian, Brian Feldman, and this is my wife Tricia. We'll pay whatever . . . whatever you think is fair. Provided you can get us our money back, of course. If not, I don't see how we can pay you at all. Christ! I guess you can tell we need help . . . pretty damn bad."

"Flop down on the couch and tell the tale. Just brush those magazines aside." I'd finished the sequence I was pretending to work on and pretended to save it with a command which made the drive light come on briefly. Verisimilitude and all that. Then I quit C++++ and swiveled to face the clients.

Brian tried to smile at his wife. "Do you want to explain, honey, or should I?"

"I'll do it," Tricia surprised me by saying. "We've been . . . I believe the word is 'compsumed,' Emagia. You probably know what that means better than we do."

"Not necessarily. Personal experience is a peerless teacher. I do know that computer subsumption has devastating effects on its victims. But remember: those effects are usually *reversible*."

Her chin was quivering as she fought to get the words out.

"But we've lost *everything* and can't even prove we're *us*!"

I winced despite my morale-boosting intentions. "That's pretty harsh. When they steal your identities along with your stuff it's 'major compsumption.' Big-league rip-off. Most broadbandits can only dream about pulling such stunts. Still have your U-cards?" I'd never heard of a fully compsumed person managing to keep their Universal-card, but it could happen.

"Brian's was taken when he tried to use an ATM, and I lost mine when we went to the police. They ran it through their data-capture machine and—"

"And someone *else's* file popped up. So the cops impounded the card. Right?"

Brian, who'd been fidgeting like a four-year-old in church couldn't keep quiet any longer. "They said they were going to 'investigate,' but that was a week ago! And they've gotten nowhere!"

"Still, they must have basically believed you. Otherwise, you'd have been arrested for sure. What have you been doing with yourselves since this happened?"

"Talking to people," he said. "Trying to find someone like you. We've been staying with friends, but our cash has run out and we can't get any more. Whoever did this . . . they've taken our savings and our business, our checking and even our stocks."

"Hold up." I savored that word 'stocks'; this case held promise! "You're staying with *friends*? Well, *that's* unusual. Heavy broadbandits generally avoid people with living family or friends. They look for super-isolated individuals or couples, usually self-employed types who travel constantly. People with detached roots, or those who've never grown any."

"That was us until a week ago. These friends of ours, we met them *after* this nightmare started. I guess we just lucked out; the Hortons are great but they can't really vouch for us."

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"Too bad. Anyone else you've had recent personal contact with? Accountants? Bank tellers? Don't laugh, I happen to think it's worth the fee to deal with a real, live *Homo sapiens*."

When society collapses, *my* accusing finger is going to be pointing at the damn banks . . .

"Think, folks! How about real-estate agents? Business associates, landlords, neighbors, waiters who might remember you paying with plastic, car sleezepeople . . . ?"

Brian patted his wife's hand despite the fact that his was trembling too. "You mean salespeople? We don't own a car. Had an apartment, but we got it through the web and never spent much time there. No families, just like you said. Our business—we're art dealers—is . . . *was* done entirely through the web. No one really *knows* us, not enough to back us up. We've always used . . . automated services for . . . for everything."

Maybe no man is an island, but this couple had dug themselves one huge trench!

"All right. I'm sure you remember your U-card numbers. Give those to me, and we'll take a sneak peek around the North American Data Base and see what's what. While you're at it, give me the Hortons' first names."

No need to draw the big gun yet, so I followed standard spy protocol, working my way into a major mainframe (Omaha's Insurance Common) with weak security but good access. From here, I could safely call up the gov files corresponding to the Feldmans' identity numbers. I logged on as Prudential rep "Anne Ominous" and my ODM (online data manager) extracted and applied the hour's password.

My clients stared at the big monitor, fascinated by the results of my keyboard prowess (no voice-driven baby toys for me). To them I must have seemed fast as teflon-coated lightning; but most of my attention was elsewhere. I was multitasking, and the second task only showed on an independent monitor—a color-crystal membrane hidden from where my guests were sitting.

My first priority was to make sure I wasn't being set up. If the cuckoos who'd pried my clients from their lives were top pros, I might have to use Uncle Terry's induction-reality gear to set matters right. I couldn't afford to get caught.

So I focused a hidden camera, digitized the Feldmans' faces, and sent the images with a sixty-four-bit sample of their voices to a certain friend in a certain government agency.

By the time the NADB files popped up, my friend had confirmed that my visitors weren't narcs.

According to the North American Data Base, they also weren't the Feldmans.

The official Feldmans were older: a heavyset, thirty-two year old, black-haired man with some nasty facial scars; and a blond dumpling of a woman with three chins and mascara-encrusted eyelashes. The kind of woman whose perfume you could almost smell over the Internet.

"There you are," I said cheerfully, turning around again. "My, but you look so much better in person."

"Those are the slashers?" Brian asked, leaning forward to get a better view.

"They may be on the team. But they're not 'slashers.'" It bugs me when people get their terms mixed up. "Slashers are hackers, mostly kids, who make destructive viruses for fun and are too immature to grasp how much their fun makes people suffer. *These* assholes are 'cuckoos,' because they take over other people's nests . . . steal their nest-eggs."

"Oh. Cuckoos. But now we know what they look like!"

"Sorry, but I doubt it. These pictures don't mean a thing. If the images aren't total fakes, our nouveau-Feldmans are undoubtedly disguised."

"Shit! So we're royally screwed?"

"*Electronically* screwed, if anything.

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Buck up! You've come to the right place." I smiled confidently, hoping my clients could see it through the murk, but not well enough for the insincerity to register. "If you guys are telling the truth, and I bet you are, someone has covered up the original information."

Tricia's eyes were running (misery or my incense?) and she was rubbing her stomach as if it ached. "How can you help us, if they erased the information?"

"Didn't I say 'covered up'? Trust me, you don't *erase* data from the NADB, there are watchdog routines just waiting for someone to try. And 'vipers' ready to do something about it. But remember the millennium hassles with the old computer systems that had only two digits for the year? Ever since then, systems engineers have left things more . . . open-ended. An expert can *add* data. And if you know exactly where and how to look, you'll find a two-byte timestamp on the modification. That's our starting point."

When I was twelve and blissfully unaware that my last growth spurt had been just that, my favorite relative, Uncle Terry, threw all his nieces and nephews a joint birthday party.

He hired Amazing Bob, the type of magician who does such gigs, and Amazing Bob treated us all to a full hour of close-up magic.

I was standing close enough to the man to smell chocolate cake on his breath when he finally pulled a stunt which left me baffled. He made a fist and slowly stuffed a big silk scarf into it. Then he opened his hand. No scarf. Then he did the whole thing in reverse.

I was truly upset; his other tricks had been child's play to figure out and I'd been feeling pretty smart and superior. The scarf had really gone into his hand, I was sure of that much, and he hadn't palmed it away or whisked it up his sleeve; both his sleeves were rolled up.

Finally, in frustration, I stormed into the kitchen to be alone and think.

Assuming he wasn't actually making the silk vanish or rendering it invisible—and nothing about Amazing Bob suggested anything remotely amazing—I could only imagine one explanation, although it seemed absurdly improbable.

He had a secret pocket hidden somewhere on his *hand*, maybe a fake finger, and that's where the scarf had gone.

This *had* to be the answer, but I didn't really believe it until I rejoined the group and scrutinized Bob's left hand.

Not only was there an obvious rubber cap on his thumb, what made it obvious was that it was an *entirely different color* than the rest of his hand. And none of us had noticed!

After an hour of intense work, I started wondering if the cuckoos had stuck the machine-language equivalent of a rubber cap inside the North American Data Base.

The time signature that absolutely had to be there wasn't. In itself, the absence wasn't suspicious enough to bring to the authorities because the cuckoos had stuck a spurious, premature time stamp in the appropriate slot. A neat trick, and pretty much impossible without altering the NADB's operating system . . . which was completely impossible. Were my clients lying after all?

It was my turn to sweat; if the cuckoos were real and way past my league, the Feldmans were up Shit Creek without a canoe. For the first time in four years, I wanted a smoke.

I copied the relevant coding and attacked it with my arsenal: unspoolers, decompilers including my own home-baked dissection program, segment tracers (the logic equivalent of audio signal injectors) . . . and got zip. Aside from one trivial checksum irregularity, which like as not was an artifact produced by one of my programs, everything seemed disgustingly kosher.

Finally, I forced myself upright. My knees were on their best behavior today so I only suffered a class three twinge as

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I excused myself and limped into the kitchen to grind my teeth and consider. Hey, it worked when I was twelve! As I passed the hand-lettered sign which displayed my motto (I cherish, therefore I am), I touched it for luck—doubtless adding another fingerprint to the hundreds which had turned the paper yellowish.

I poured myself a glass of water from the pitcher I keep in the fridge and took a long sip. Lord above, I thought. What a lousy host I am, I haven't even offered my clients so much as a—

There was a logical explanation for the missing time-code! There *was* a fake finger in the data stream . . .

The cuckoos must have installed an entire *program* within the NADB, an application designed to hide itself while providing selectively false information.

My, my. The implications sent shivers down my neck. The NADB contained no free memory space where such a large program could be inserted; therefore the program could only have been constructed by installing a routing shell which utilized building blocks that were *already there*: storage and retrieval subroutines plus bits and pieces of various data files.

Fantastic! M.C. Escher himself would've had trouble visualizing how to fit such elements together. Someone *smart* had cobbed together a Frankenstein program and made it invisible . . . or was it invisible now that I knew about it?

"News, folks. Maybe good, maybe not. But I've got an idea," I announced upon returning to the living room. Tricia and Brian, who were huddled together on my couch like flood victims on the rescue boat, looked up with new hope. I winked at them and seated myself before the terminal.

And there it was. The program's existence had become as obvious as a pink thumb on a tanned hand. Obvious to *me*, that is. The pattern wasn't distinct enough to prove anything to the authorities. Hell, even a fellow expert might accuse me of having an imagination. And now that I'd identified the program, there was a problem.

I tilted way back in my chair, staring up at my dirty ceiling.

The couch creaked and garbage crunched as Tricia arose to stand behind me, looming like a mountain, eyes focused on the monitor. Brian got up too and stood next to her, shifting his weight noisily from foot to foot. Their faces looked spooky upside-down and ninety percent chin.

"What's the matter?" Tricia asked.

I hadn't meant to sigh out loud. "Someone installed an application here which allows genuine data to be pulled from the files, but that data never sees the light of day. Instead, it's stored in a temporary batch file and the nature of the information tells the program which false data to send on."

"Can't you erase it?" Brian asked anxiously.

"The program? No way. Anything you stick into the NADB gets protected as if it stood on holy ground."

"What *can* you do?"

"Add some lines of my own. Trouble is, I can't see the thing well enough to know where the lines should go. It's encrypted in three interdependent layers . . . which means—damn it!—it must have a self-contained interpreter!"

Tricia reached down and squeezed my shoulder as if *I* was the one in trouble. "Half the time, I've got no idea what you're talking about, but are you saying the . . . cuckoos are using some kind of secret code?"

"In a manner of speaking."

"Can you . . . crack it?"

"Not in a reasonable length of time, Tricia. Not by any *normal* means. This isn't like a substitution-cipher where you merely have to figure out which letter goes where. We're dealing with *algorithms* here, and there are so many freaking possibilities that—"

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"So we *are* screwed?" Brian interrupted.

"Brian, my friend. Work on that defeatist attitude! There may, I say *may*, be a way to get timely results, but . . . it's going to require a lot of trust." Mostly from me.

I sat up straight and pivoted around. My clients were watching me the way my cousins had once watched Amazing Bob.

"I'm willing to take a *humongous* chance," I said slowly. "And I'll need your help to do it, but you two have got to swear to keep my secrets and *mean it*."

They silently nodded agreement in precise unison. Their sincerity was thick enough to spread on toast.

"Now as to my fee . . ." I stated a price and they showed no interest in haggling.

I took a deep breath. "Here goes. I've got a gizmo here that might allow me to . . . corrupt the enemy program by interacting with it . . . um, *personally*."

"What kind of gizmo?" Brian asked.

"It's called an 'inductive-reality stimulator.' IRS, like the tax piranhas. It was invented by . . . a friend of mine who designed the prototype for NASA."

This "friend" was actually my Uncle Terry, Dr. Terrance Peabody, but my clients didn't need to know everything.

"It works by producing complex, moving magnetic fields which match the brain's own rhythms and flows. Then Faraday's Law of Induction goes to town. Far as I know, only two of these devices exist. NASA's got the original, and I've got the improved version. Fantastically illegal, by the way."

Brian raised his hand classroom-style. "Why so illegal?"

"It proved to be far more powerful than anyone expected; in the wrong hands this thing could do some heavy damage. So it was declared top-secret and off-limits."

"But what does it *do?*"

"Allows me to access data systems through symbolism."

"You've lost me completely," Tricia groaned.

"It puts me in direct, but subjective, contact with whatever data system I hook up to. I experience that system as another world, but not like Gibson's cyberspace—"

Two blank looks had derailed my train of thought.

"You've never heard of William Gibson?"

Dual headshakes, side-to-side this time.

"Maybe you guys need to get *in* more. He was a writer. Influential. About fifty years ago, he . . . suggested that your mind could experience a kind of universe *inside* data-streams . . . if you got out your soldering iron and did some deft work on your own head. He named this universe 'cyberspace'."

"I've heard that word," Brian admitted.

"It's still uttered now and then. So here's how you get there according to Gibson: Run wires to your brain, attach them to a jack, install the jack in your skull and you're ready to party! Then you take the appropriate cable (God knows what *that* would be) and attach the jack to the family laptop. And, voilà, you wind up inside. Infinite cybernetic vistas, that sort of thing.

"Nice to see you two can still smile, but Gibson was apparently serious. Sadly, the human mind doesn't work like that. While you can trigger sensations or memories by zapping various parts of your brain, that brain works in—and I'm quoting my friend here—'prolific, multichannel, simultaneous, wide-spread, bioelectric-chemical chains.' You need a prolific, multichannel, etc. *interface* for the job. Put it this way: you can go spelunking Sylvius fissure, say, but you'll never find a spot marked 'input'."

"So your IRS uses a . . . magnetic interface?"

"Bee . . . Aye . . . N G O! First nut that stuck his head inside a powerful electromagnet saw light. Then some re-

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searcher, showing more sense, applied magnetic field stimulation to *other* people's heads and discovered that it made his subjects experience all sorts of—"

Brian leaned forward excitedly. "So *your* interface puts your mind in cyberspace?"

I grinned. "*Not* cyberspace. With the IRS, information takes on . . . personality. You'll understand when you see it working. The point is to let my subconscious mind grapple with problems by *feel*, problems too complex for my conscious mind to—"

"Are you talking about virtual reality?"

"Virtual reality, ha! Goggles. Touch-gloves. CGI. Kid stuff. This is *immersion* reality and, believe me, there's a difference. With the IRS you are *there*."

Brian frowned at the mess on the floor and then glanced through my thin, dingy window-curtains and frowned some more.

"How did something so . . . ultra-tech wind up . . ."

"In a dump like this? My friend wanted to keep experimenting with the machine after NASA canned his project. So he gave the new one to me for safekeeping. Purloined letter technique." My clients were looking blank again. "Doesn't anyone *read* anymore? I mean hidden in plain sight—figuratively speaking. Enough talk, let's get rolling. Except hang on for just a sec, I need to go tinkle and fetch woman's best friend."

Little Mo was a canine angel, asleep and curled up on the floor atop my favorite throw rug. The ever-vigilant watchdog, I thought. Ready at a moment's notice to defend his mistress! I woke him up by whispering stuff in his floppy ears that I'd be too embarrassed to repeat. He wagged his tail as he stretched.

My clients looked distinctly alarmed when I returned to the living room followed by such a behemoth.

"This is Little Mo. He's half German Shepherd, half Irish Wolfhound. Mo, these are friends of mine; be nice. Hold out your hands, folks, and let Mo get a good sniff. Don't worry, he's completely gentle once he knows you."

With formal introductions complete, I parked my dog and his refilled water dish near the door. That was definitely that. No one would get in now without my permission.

"Time to get the system warmed up, folks . . . which in this case means cooled down. Should be enough liquid helium left." I was busily uncovering various components and connectors and snapping them together. A deep humming arose from under the debris near one wall.

"Takes a minute to get the field up to strength," I remarked. "You might as well sit down. Or better yet, if you need to use the bathroom, now's the time. Down the hall, second door to the left."

Tricia was wiping her eyes again and I decided to let the air clear a bit. The incense holds back a deliberate stench, part of my security system. When I have to go out, it's nice to know that intruders are not only going to suffer, they're going to leave a scent-trail for my dog to follow. Of course, when Little Mo is around, intruders become *out*-truders fast, but the big baby whines if I leave the apartment without him.

"Are you OK, Tricia?" I wondered.

"I'll be all right. I'm tired, that's all. Didn't you say something about needing our help? What do you want us to do exactly?"

"Take the clamps off after I'm done; it's a lot faster if I don't have to do it myself. But mainly, I need you to watch the monitor while keeping an eye on me. The membrane will mostly show stuff from the world I'll be in, but all sorts of information can suddenly pop up on the screen—from my memory or from the NADB—and I won't know it's there. I want you to tell me if anything . . . *germane* appears."

I rooted through garbage for the heav-

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ily padded clamps and attached my chair to the floor and my legs and waist to the chair. Then I assembled the headset and put it on, hooked the bottom part of the arm-clamps to the chair, loaded the IRS software and targeted it to the directory of the NADB where the covert program lurked.

"If I had a real lab," I complained, "I'd just push a shiny button. You'd hear a smooth whirring and everything would just *happen*. As is, the only automatic part is these arm clamps. They'll close magnetically when the program starts."

"What are the clamps for?" Brian asked suspiciously.

"They look a little ominous, don't they? The software is going to build me a virtual body with a virtual nervous system tied in to my real nervous system. Meanwhile, the hardware here will read the muscle-moving nerve impulses from my brain and use them as controllers for the virtual body. Are you with me so far?"

"I think so."

"Good. Now here's the tricky part. We don't want my actual body lurching around the apartment while I'm busy elsewhere, so the hardware has a selective buffer designed to keep nerve impulses from reaching my muscles. Not *every* nerve-impulse is blocked; I'll still be able to interact with the actual world in certain ways, and I'll still be able to breathe which I approve of. But the buffer isn't perfect, so the clamps will stop me from banging into things if random impulses get through.

"I see." Brian sounded quite relieved and I was saddened to have to spoil that.

"I suppose I should tell you there's another reason for the clamps. There's a . . . small hazard we could conceivably run into."

"Which is?" he asked softly.

"Seizures. They only happened to me once but I was pretty sore afterwards."

That news brought no one any joy and Tricia was now looking downright scared. "You're a lot braver than me," she remarked. "What are we supposed to do if something goes wrong?"

"I won't be able to see you once I enter the induction world, but I'll be able to hear you and talk to you. If I stop responding, punch any key on my keyboard. If I start foaming at the mouth or go all rigid or start twitching, push a key, only hurry up about it. OK? So . . . everyone ready?"

I put my arms into the proper positions, my index finger could just reach the keyboard's return button, and I triggered the—

This time, it was a gray void. I couldn't see or touch my new body, but I could feel it working, expending energy. Then my feet materialized and I watched their movements with interest. Apparently, I was walking.

There was a moment of confusion as if each of my eyes was perceiving different universes. When this cleared, a pebbled path was under my feet. It felt softer than it looked. There was no sky here, nor any bright light-source, but each pebble had highlights as if reflecting a noon sun. The highlights made the path appear magical and luminous.

"What's happening?" Brian asked.

"I'm just getting oriented. Be patient. What's on the monitor?"

"Nothing. Wait . . . there's a narrow road. Tiny rocks . . . "

Tricia's voice chimed in, "Bare feet just appeared toward the bottom of the screen, kind of tromping along. No body, just feet."

"Those are mine. The rest of me should be showing up pretty soon. Remember that everything here is a symbol of something, but it's all made of code. Those pebbles are little chunks of . . . hold on! Something's happening up ahead."

In the distance, a fantastic castle was forming. It stretched up and up, a thousand walls within other walls, all with wide merlons, narrow crenels, and thousands of turrets and balconied

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minarets. Innumerable bright flags flew proudly, illuminated by an invisible sun and blown by impalpable winds . . .

"I see it. One hell of a fortress," said Brian. "What's the symbolism?"

"Don't know yet, but I'm obviously headed there."

The base of the castle was obscured by a huge bonfire and there was a vague shape in the center of the flames.

My arms and legs emerged, then my torso. By the time I could touch my new face, I was smiling. In this world I was no dwarf with arthritic knees. The road felt solid now and grassy meadows had manifested to either side. With no warning, running shoes condensed from the void, appearing on my feet complete with tied laces. Message received: *long* way to go. I began jogging.

"Hey! I can see you now," Brian stated. "Except you're not, ah, wearing anything . . . except shoes and you look . . . "

"Different? I bet. Clothes will appear if and when they're called for. Uh-oh. Check out that bonfire!"

The shape in the fire was beginning to resemble an exceedingly large reptilian animal. When its titanic chest suddenly expanded, all the surrounding flames were sucked into the beast's mouth, leaving the creature alarmingly exposed to view.

Brian whistled. "My God! What *is* that thing? Some kind of dragon?"

The oriental kind perhaps. Maybe Tibetan—the head had a certain bumpy look. Yet there was something tauntingly familiar about the shape of the eyes. . . .

"Here's my guideline, Brian," I said quietly. "If it looks like a dragon, and breathes fire like a dragon . . ."

"I thought dragons," Tricia grumbled, "were supposed to breathe fire *out*, not in?"

"Right you are. And that deviation certainly means . . . something. God knows what. But I do see an underlying pattern here. Each time you use the IRS it's different, and this time it looks like I'm stuck in a medieval fairy-tale. You know, the kind where some poor schnook has to face the inevitable three challenges. My subconscious probably got the idea because the program we're trying to mess up has three levels."

"This is a *game?* How do you win?"

"Bet the first part is getting past the dragon."

"That doesn't look easy," Tricia said sympathetically.

It only took a few minutes more to reach the great beast but the whole time it kept seeming bigger and bigger. If the animal was big, the castle was simply stupendous from close up and it came nicely equipped with a wide moat. The path, here paved with seashells, ended at a narrow drawbridge which arched over the murky water; on the far side was a huge, closed oak door which led into the castle.

Purposeful ripples on the surface of the water advertised the moat as a dubious choice for skinny-dipping.

Get past the guardian, cross the drawbridge, open the door. The problems, at least, seemed clear enough.

The dragon fixed me with a golden eye larger than my fridge and moved to stand directly between me and the bridge, but with its body at a slight angle.

If this was a fairy-tale, perhaps . . .

I snapped my fingers and gilded armor even brighter than the dragon's eye materialized on my body from my feet up; I heard my clients gasp.

"How did you *do* that?" Tricia wondered.

"I told you. In here, I'm a magician." Still, every time I use the IRS, my powers are different. It takes time, thought, and some luck to find them.

"Shoo," I said to the beast towering above me. "Go away. Bug off."

My words would have had more effect on a Detroit mugger.

"Listen, dragon, you're . . . wailing for a scaling."

Tricia giggled nervously, but the dragon didn't appear to be amused. I tried a

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few experiments. Mental commands neither moved the animal nor made it vanish and efforts to produce magical lightning only made my sinuses ache.

"This may seem crazy," I said to the clients, "considering our size discrepancy, but I'm going to try the direct approach and give Puff here a mighty shove."

The dragon allowed me to get close enough to touch its scaly leg, before it reached down and bit my shoulder.

I jumped back instinctively, yelling with pain and surprise. The sudden shout startled Tricia and Brian into bellowing questions, which made Little Mo start barking. A shockwave of alarm. The armor hadn't protected me enough—the thing's mouth had been *hot*. My shoulder felt mangled and burned and I struggled for self-control.

"Damn," I swore. "That hurt! Shut up, Mo. There's a good dog. Tricia? Can you pull my blouse down far enough so you can see my left shoulder?"

"Yes. Oh my God, it's bruised and red! With *blisters!*"

"Any blood?"

"No. I don't understand how something . . . in *there* can hurt you out here?"

"The mind-body connection is a lot more tangible than people think. Except for my ears, mouth, and lungs, which are in both worlds, I'm essentially *here*."

While I was talking I had a horrible thought: what if the beast had bitten my *head* off? Which gave birth to another question: Why didn't it? It hadn't met me quite head-on, it didn't take my head off. . . .

Perhaps Puff was an indirect sort of fellow.

But the kiddy virtual-gloves were definitely off now. I concentrated, and a shining sabre appeared in my right hand gauntlet. I'd never been able to do *that* before, at least not in the same way, but I'd never faced a mythological beast either.

"I see a sword," Brian said, "but isn't it a bit small?"

True. The sword was a joke for what I had in mind, but I willed it to grow longer . . . and it did. Its weight stayed impossibly constant.

"Get out of my freaking way, animal, or die," I snapped.

The beast didn't move so I swung the blade, effortlessly separating the reptilian head from the long neck. No gore. The head simply vanished. A bifurcation appeared on the wound, swiftly growing into two independent necks. Then two new heads, half-sized but otherwise identical to the original, appeared on the ends. One head was tilted slightly to the right and the other to the left.

"The old Hydra routine," I muttered. "How conventional."

The dragon was regarding me now with four eyes, none filled with love, and for an unpleasant second, I thought it might charge. Luckily it did no such thing.

Or was it *bad* luck? I might have dodged around and reached the drawbridge.

Head removal was out, so I tried stabbing the creature in the chest. Silly me. The cut opened up, and out shot a smoky sphere whose core was bright blue flame. I jumped to one side and the peculiar object veered to follow like a guided missile.

"Do something!" Brian yelled.

A pole topped by a shiny umbrella sprouted from my left shoulder—the best I could manage on short notice. The fireball landed on this impromptu shield, making an audible clunk, and knocking me to my knees. Heavy flames? Even shielded, the heat was painful. I managed to shake the damn thing off—it was *sticky*—and it hit the road with a second clunk. There it sat, burning merrily away as if it were homesteading an oxyacetylene leak.

"What the hell!" I shouted repeatedly. When scared, I usually get mad.

Experimentally, I shrank my sword

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and tried to give the fireball a nudge. It rolled a few inches *towards* me and clung to my sabre so tightly, I was forced to dissolve the sword and materialize a replacement. By now, I was utterly bewildered.

"A diagram with some symbols just appeared on the monitor," Brian stated.

"About time! A diagram of what?"

"I don't know . . . it's already gone. It was animated. Two thick dotted lines came together in the middle of the screen and then they hit and a bunch of thinner dotted lines went off in all directions."

Lord above, such a diagram could represent anything from a billiards trick to a stellar collision! "Please tell me you noticed something else. Anything?"

"I did," Tricia volunteered. "The thickest of the thin lines was labelled with . . . like a 'W' and a number. 3,280."

So! "Was this 'W' *curvy*, by any chance?"

"I guess so."

"Lower-case omega. Good eyes, Tricia! *Thank* you, things are clearing up."

"Not for us!" Brian said.

"Look, when you deal with the subconscious, you deal with mish-mash. Somewhere in the back of my brain, I've made some bizarro associations. The initial level of the program we're up against has to be small because the NADB offers such limited space. So my subconscious evidently began thinking *tiny*. This fireball represents an *omega* particle—a sub-atomic artifact and the heaviest baryon of them all. You can produce them by colliding protons, but they don't hang around all day in normal reality."

"And that number?" Brian continued.

"Electron mass. You'd need that many electrons to balance a see-saw with an omega particle on the other side. And it's negatively charged; did you notice how it moved in my direction when I pushed on it? Even *pushing* is symbolic in these parts." The way it had tracked and clung to me implied that *I* carried a positive charge . . .

"God damn. How do you know all this stuff off the top of your head?"

"Because it's already in the bottom of my head. That diagram was something in my memory, not stored in the NADB."

"But what does it mean?"

"The dragon's chest is the part of the program which does the dirty work. You remember how it inhaled the bonfire? Good data goes in, bad data—heavy and negatively charged—goes out if you try to retrieve the good data. Breathing imagery. Remember these are *my* symbols."

"If the dragon represents programming," Tricia asked slowly, "what does your sword represent?"

I should have been asking myself the same question. "Well . . . what does a sabre *do?* Divides things, right? Mine has a strong positive charge, although I'm not sure why. Whatever, if the sword represents simple division . . . the encryption we're trying to break must be mathematical. Our 'dragon' is probably—"

"How the hell are you supposed to defeat *math?*" Brian griped.

"I've an idea about that, but first . . . "

I made my latest blade grow longer. Then I jumped up and cut off both the dragon's new heads.

Three heads grew back. I removed these and this time five appeared.

"What are you doing?" Brian asked anxiously.

"Don't . . . bug me for a minute please . . . or debug me. I'm keeping count. . . ."

One more experiment produced eight heads.

"All right, ladies and generalmen, I've got it. Excalibrate here represents *subtraction* not division and—"

"Subtraction? Minus? Shouldn't your sword have a negative charge?"

"Sounds logical, Brian; but this realm has its own logic. Think small and think mish-mash. My guess is that bytes here are confused with atoms. I think the sword is minus all right, minus *electrons*. Positive charge."

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"Oh."

"Now here's what I learned: our dragon is sadly trite. Originally it had one head. I subtracted it, right? That number was added to the previous and only number in the series so far, one, and two heads appeared. After I cut those off, *that* number was added to the one and we got three. Next, the three got added to the two and presto! Five. Then five and three bought us eight. See? Keep adding each new number of heads to the previous number to derive the next number. It's nothing but the old Fibonacci series. Final test: I'm going to decapitate our friend here to the tune of all eight heads, if I can, and you should see thirteen new ones emerge. Watch."

It made sense. The encryption algorithm needed to be short and sweet yet produce an evasive, non-linear pattern. Nothing head-on and predictable. And the dragon's eyes, I suddenly realized, were shaped like *sunflowers!* Sunflower seeds, like so many things in nature, are spirally distributed according to the Fibonacci series . . . .

Brian was counting out loud. "Thirteen, just like you said. But if heads keep growing back endlessly, how are you supposed to get rid of them all?"

"Solutions, my friends, often lie in coming at problems from another level."

I gave my clients a few moments to ponder the philosophical aspects of my statement, then lengthened my sword and cut the dragon's legs off. The legs, bleeding a thin, clear liquid, fell neatly away from the body and vanished. The beast fell to the ground and became still.

"I figured the legs were constants," I said smugly.

With renewed confidence, I stepped around my vanquished enemy, heading toward the drawbridge. Until my right foot encountered a trickle of dragon blood.

It was more slippery than black ice. My feet went flying and I smashed down on my back hard enough to slap my breath away.

"Are you all right, Emagia?" Tricia asked anxiously. "What happened? Bry? Did you see? Her body twitched and now she's not answering . . . . should we press a key?"

I couldn't talk, but I shook my subjective head in denial and hoped that someone would notice. Of course, they were watching *me* now, not the screen.

"She fell pretty hard, honey. I saw it happen. Maybe we should give her just a minute more?"

"I'm counting to ten and if she doesn't say anything, I'm pushing the button. One, two . . ."

On "eight" I finally managed to wheeze a faint, "No." It took five minutes before I was ready to continue.

One thing was troubling. I still had my armor.

Which implied I still needed it.

When I was able to sit up again, I took off a gauntlet and my right boot and felt along the sole with my index finger. It felt incredibly smooth until the remaining "blood" slowly ran off, leaving the sole dry and rough. Slippery and viscous at the same time; very odd . . .

Silicone lubricant from silicon valley?

My back-brain idea of a superfluid? Strange question for the day: What substance would be a superfluid at . . . dream-temperature?

I put my clothes back on, cautiously got to my feet, and approached the bridge. Which looked harmless until I actually stepped on it. The freaking thing threw me backwards so hard, I almost fell again, only this time on my face.

I gathered myself up, and got a running start . . .

Next thing I knew, I was lying in a cozy nest of dragon's heads making an unpleasant discovery: the beast was coming back to life. Thirteen slender necks arose like hyperactive cobras and golden eyes began regarding me from all directions. Each head wasn't much bigger than my own now, but the hundreds

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of teeth looked remarkably long and pointy.

I got out of there *fast* and made sure to stay beyond snapping range.

"The drawbridge," I bitched, "is a high-speed, moving ramp going the *wrong way*."

"What is it really?" Tricia asked.

"Likely what programmers sometimes call a 'diode.' A connected series of 'goto' instructions. Hard to cross from the wrong side."

"You created a sword," Brian pointed out. "Why not make your own bridge?"

"Because I wouldn't be playing the game and interacting with the challenges. Hey! Here's a thought: what about the dragon-blood? What if it's a semiconductor? One place you can expect to find silicon: silicone lubricant.

"Listen folks, if I remember my elementary electronics, and I do, semiconductors work with 'charges' moving in one direction while the 'holes' move the other way. So . . ."

I removed my gauntlet again and filled it with fluid by dragging it along the ground. Then I stood in front of the bridge and carefully poured dragon-blood across my shoulders.

"A semi-conductor," I explained, "moves packets of electrons. Negative charge. Remember what happened when I pushed on the omega particle? If I can coat my body with goo and the bridge tries to push me away . . . well, the logic is a little stretched. We'll just have to see."

I touched the armor over the small of my back with my bare hand. Still dry, so I waited a minute and tried again. This time, it was nice and greasy.

A minute more and my legs were coated. Before the stuff could reach my feet, I jumped, landing on the drawbridge sitting down with my legs straight out in front . . . and BANG!

I was on my back again, my armor dented like a car after a head-on collision and my head spinning like one of the tires.

"You did it!" Brian shouted. "Wow! Are you hurt?"

Sure enough, I was on the good side of the bridge and had evidently smashed into the door and rebounded. I groaned experimentally and decided that the armor had been justified after all . . . but why was I *still* wearing it?

"I'll be all right. Eventually." I struggled up and got my first close look at the door. No dents there. Also no handle or knob and the thing was immovable as a mountain—plus some force kept pushing my hand away.

I retrieved my sword, shrank it to a convenient size and hacked away at the oak. It bounced off and with prejudice. The door had a serious positive charge! Without much hope, I transformed the sabre into an axe and nearly took my leg off. I tried magic next, mental orders, and the tried-and-true method of gaining entrance: knocking. I couldn't hit the thing hard enough to make more than a tap. Even the most inventive swearing failed to get me into the castle.

Worse, when I looked back at the dragon, it was sitting up on little stumps. Somehow the damn constants were regenerating. If I didn't complete the puzzle soon, I had the feeling there was going to be some new breed of trouble . . .

"I'm running out of ideas, folks, and I'm getting tired. This takes it out of you after awhile. Suggestions are welcome."

Silence.

"I know you're out there, I can hear you blinking."

Brian cleared his throat nervously. "Didn't you use the word 'interdependent' when you were talking about the three parts of the program you're trying to bust?"

"Sure I did. So?"

"You used part of the dragon to cross the drawbridge. Maybe you have to use part of the dragon to open the door?"

"Absolutely! Of course I do! Except the solution should require both the

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dragon *and* the bridge. Tricia, give him a hug, he's earned it."

But now *I* needed to earn it. Brian had supplied the key, but I needed to figure out which way to turn it.

I looked across the moat to where the symbolic omega particle was still burning on the road of seashells (command seashells?). My subconscious had made everything so completely obvious and I *still* had managed to miss it!

But the bad news was that, for the next part, I needed to stand in the worst possible place and hope that momentum could overcome attraction. Now I knew why my armor was hanging around. I tried not to groan as I pulled my visor down over my eyes.

"Fireworks coming, folks, keep your eyes on the screen."

The dragon was watching me thoughtfully and the stumps were much bigger. I reformed my sabre, made it grow outrageously long, and gave it a slight convexity to match the arc of the drawbridge. Then I lowered the sword and stabbed the dragon in the chest for the second time.

The new fireball rolled far enough to touch the bridge and, being negatively charged, was hurled in my direction like a cannonball on uppers.

No time to dodge. The sphere knocked me over, rolling right over my face and it was *hot*, but it didn't stop to pass the time.

I picked myself up; after this session, I was going to be one purple bruise. But the "particle" was sticking to the door as I'd hoped and the oak was burning brightly while the fireball was dying down. Lovely! Who would've thought that establishing a neutral charge could be a thing of such beauty?

When the fires were gone, so was the door. Inside the castle were stacks and stacks of books . . . the North American Data Base appearing in this waking dream as the ultimate library.

My clients were ecstatic, whooping and cheering, and I felt pretty damn good myself; I'd really wanted to help these people.

"It's us!" Tricia cried.

Us? "What are you talking about?"

"Our own faces! On the monitor! And all the right information! You did it! But I don't understand how. I thought you were going to crack the code and then put in some 'lines' of your own?"

"Someone press a key, please. I'm pooped and it's a bitch to make a subjective finger reach into the normal world."

Brian and Tricia had sobered up somewhat, but their eyes reflected my videomembrane with new enthusiasm. Tricia was grinning at me although her forehead was corrugated with puzzlement.

I returned her smile, leaning back, relaxed and immeasurably relieved; the IRS was still in early development and using it was more of a risk than I'd let on.

"You still don't quite get the nature of immersion-reality, I'm afraid. Solving those three puzzles *was* putting in my own code. We're all done here. Go back to the police. Give them your identity numbers again. Not only will your problems be history, they'll be able to see when and how the changes were made. With some work, they may even get clues about who did this to you."

"So everything is back to normal?"

"Soon as you talk to the police."

Tricia sighed with relief. "That's incredible! But it's a little strange. It doesn't feel like anything actually . . . happened."

"Right. I'll tell you something. It's going to take the human race time to adapt to the . . . cowardly new world we live in. We've evolved to expect . . . proportional effects. It's always taken physical effort to accomplish things, and now people's lives can be turned upside-down with a few keystrokes. Information has no mass. But listen to me, folks. What happened to you, happened in

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part because you let yourselves get far too *unconnected*. As far as I'm concerned, I cherish, therefore I am. And what *I* cherish most is *people*. Right?"

"We'll never let it happen again," Brian said firmly.

"Good. Human contact: keep in touch. And don't worry about my fee, I'll be sending a bill in due course. And guess what? You've both been so helpful I'm giving you a twenty percent discount. All right? Fantastic luck to you both."

Tricia leaned down to give me a hug before they left and Brian kissed me. Right on the lips! Human contact. I was thrilled to see they were already taking my advice to heart.□

IN TIMES TO COME

Our September issue features quite a range of contents, including parts of three series: one old and popular, one almost new, and a third just beginning. *Analog* readers have already enjoyed several stories about Professor McAndrews, his inertialess drive, and starship captain Jeanie Roker; next month you'll discover some surprising skeletons (figuratively speaking) in McAndrews' family closet. Shane Tourtellotte revisits the uniquely disagreeable but talented Oswald Pitt (who, in "Finding a Voice," was a human crew's only way to communicate with another species) as he invents a new way to subvert a civilization—which can be very bad or very good, depending on your point of view. And James Gunn launches a brand-new series about a "Gift from the Stars." How do you react to a really valuable gift when you don't know who's giving it to you—or why?

Stephen L. Gillett, Ph.D., once more provides the science fact article, this time on "Unresources." We hear a lot about commodities whose supplies are becoming inadequate to meet our needs—but what about those for which the supplies have become excessive for our needs?

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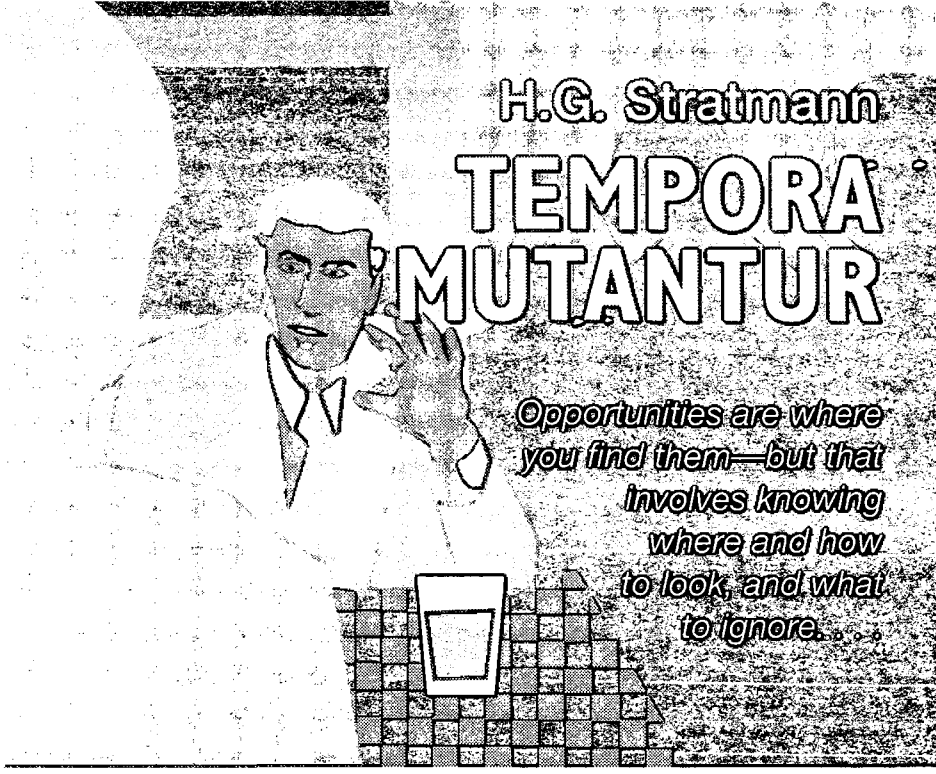
H.G. Stratmann
TEMPORA MUTANTUR
Opportunities are where you find them—but that involves knowing where and how to look, and what to ignore. . . .

The Times are Chang'd, and in them
Chang'd are we.
How? Man, as Times grow worse,
grows worse, we see.

—Owen's Epigrammata [1615]

I'm a very private person.

Not antisocial. I don't mind being around other people—if they leave me alone. As long as they aren't looking over my shoulder, or staring at me, or meddling in my personal affairs, my attitude is live-and-let-live.

During the week I rarely leave home, a cozy, secluded house deep in over a thousand acres of wooded land I own in the Missouri Ozarks. It's a place I can live by myself and work in peace, with no neighbors close enough to disturb me.

But even I need a little human companionship now and then. Every Sunday evening I drive to Kansas City. There's an out-of-the-way restaurant in the county that serves the best barbecued ribs I've ever tasted. If the place had a bit more class, it might qualify as a honky-tonk. While I'm told it's packed every other night of the week with diners and dancers (most of them there, I assume, to perform modern mating rituals), on Sunday night I have the restaurant pretty much to myself.

This Sunday night in late October was no exception. I was in my favorite booth in the back corner, stomach rumbling in eager anticipation of the ribs I'd soon be depositing there. A large dirty pane of glass and sizzling neon sign—"Joe's *ar & G*ill"—framed the front of the restaurant. Hazy streetlights shone on dark, sparsely populated sidewalks. Cars and buses rumbled fitfully through the nearby intersection, sporadically attentive to whether the traffic light was green or red.

The restaurant was deserted, a dimly lit tableaux of empty tables, booths, and mudstained tile floor. Its bare wooden walls were decorated unimaginatively

Illustration by Shirley Chan

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with horseshoes, cheap etchings of cowboys roping cattle, and other rural accoutrements. A cheerful, private place where nobody knows my name. Mainly because, though I've been a regular here for several years, I've never told them. Always use cash, so there aren't even any telltale credit card signatures. It's a harmless personality quirk of mine. I value my privacy so much I don't even like to tell people who I am, if I don't have to.

The stools at the bar were empty too. Joe, the sluglike bartender and owner of this elegant establishment, was sitting in a chair that barely supported his Pickwickian weight. His head bobbed up and down like a pendulum, grunts emerging intermittently from his jowls, as he tried futilely to stay awake. Probably been sampling his own wares again.

If I turned my head I could peek through a small open window into the kitchen. The mouthwatering aroma of well-grilled meat drifted through it to my grateful nostrils. Mel, the grizzled cook, was sitting hunched over by his stove. He seemed to be having an intimate moment with himself while perusing a magazine full of pictures with a very low ratio of clothing to nubile female bodies. Hopefully he'd remember to wash his hands before he prepared my barbecued ribs.

As I nursed an ice-cold glass of soda (alcohol kills brain cells) I watched Mildred, the only waitress on duty, walk over to the new jukebox in the corner. The faceplate on its front proudly displayed the legend "Another Fine Product from IQ Industries," indicating it had an artificial intelligence module inside. Supposedly these updated jukeboxes can not only download the latest human-generated hit songs, but their AIs are programmed to compose brand-new ones on the spot. Push a button for the appropriate theme—"Unrequited Love," "Requited Love," "Love That Was Requited But Then Went Sour Because You And/Or Your Significant Other Got Bored Or Found Somebody New," etc.—and the AI would use its compositional algorithms to create lyrics and music for your very own custom-made song.

Considering the limited musical language and themes of most popular music, I didn't think the AI's programming had to be very sophisticated. Still, I was interested in hearing what it could do. As Mildred put a few coins in the jukebox I hoped she'd chosen an AI-made selection. But no, I recognized the tune blaring from the machine. Twanging guitars and a thumping bass accompanied the latest hit by Kewpie Barton, the former Secretary of Agriculture who'd achieved far greater fame in her new career as a country-western singer. Her shrill soprano lacerated the bittersweet lyrics of "Ungulates' Odyssey,"

"You promised you would love me until the cows came home,
No burgers-on-the-hoof I thought I'd ever see.
But those distant moos and lowing, I hear comin' o'er the pasture's loam,
Mean stampeding bovines'll soon be trampling upon me!"

Enraptured by the music, Mildred wiggled her taut jeans and loose blouse over to my booth. "Anything else I can do for you, darlin'?"

The sultry tone in her voice told me she wasn't talking about getting me another Pepsi. Fifteen years ago she must have been a real stunner. Even now, with prominent parts of her late-thirties anatomy sagging a bit and her face needing generous helpings of makeup and lipstick to approach centerfold standards, she was pleasant to look at.

Best of all, on slow nights like this with Joe lost in slumberland, she wasn't adverse to moonlighting in a back room for a reasonable fee. Though I'm a very private person, even I get an itch sometimes. And Mildred was an expert at scratching it. Despite her name, there wasn't any *Of Human Bondage* thing

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between us. Just a mutually beneficial business relationship.

I smiled at her. "Not tonight. I'm a little overexcited. Too much on my mind."

Mildred sat down beside me, her braless breast nestling warmly against my arm. The honeysuckle scent of two-dollar perfume wafted towards me, even more succulent than the aromas from the kitchen. "Are you sure?"

She tossed her long bleached hair in the direction of the bar and Joe. "Old lardbutt over there won't miss me."

"Well . . . maybe that would be a nice way to celebrate. Besides, I probably won't be here next week. Going on a trip."

She looked disappointed. A true professional. "I'll miss you. Will you be away a long time?"

"I guess you could say that."

Traffic noises swelled briefly, then were muffled again as the front door opened and closed. Joe roused himself long enough to watch the well-dressed fortyish man walk briskly by the bar, then resumed his nap.

The newcomer was the last person I expected to see here. He looked like the very model of a modern business executive—which he was. Tall, wearing a thousand-dollar designer suit, with handsome features and blow-dried curly hair splashed with just enough gray at the temples to confer an aura of wisdom and authority. Not the kind of clientele this place usually catered to. Besides, he should be a couple thousand miles away.

Rem saw me an instant after I spotted him. He sidled into the seat across the table from me.

I glared at him. "Almost didn't recognize you without your bodyguards. What the hell are you doing here?"

"We need to talk." He glanced sharply at Mildred, still scrunched warmly against my side. "In private."

She jumped up like a new Marine obeying a drill sergeant. Rem has that effect on people.

Mildred stammered, "Can I get you a drink, or a menu—"

"No!"

Her eyes darted from him back to me, a trace of puzzlement crossing her face. Then she slunk away.

I took a sip of my soda. "How'd you find me?"

"I've been calling you at home and sending you e-mail for the last week. Couldn't reach you."

"I've been away."

"Then I remembered you liked to come to this place Sunday nights. Remember, we met here last year? So I flew out from the coast this evening hoping I'd find you."

I scratched my beard. "Well, congratulations. You found me. Been a nice visit. Don't let the door hit your ass on the way out."

Rem's famous steely eyes softened in a way I'd never seen before. This hard-nosed master of men, this iron-willed captain of industry, looked—*desperate*.

"Just listen, will you? You're the only person I can talk to. The only one who might believe me. And help me."

When Rem was reduced to asking me for help, it must be serious. I decided to humor him.

"OK. What's your problem?"

Rem leaned forward and whispered. "I'm being stalked."

"Is that all? Who is it—somebody you downsized, like me? Or an ex-lover?"

"No. There are over twenty of them. I think they're—" His face contorted, barely able to whisper. "I think they're time travelers."

The glass of soda stopped halfway to my lips. I set it down slowly.

Time travelers.

I couldn't believe Rem had that much imagination. He and I go back a long way. Have a lot of superficial things in common. Same age, same background. But we're about as different in our personalities and attitudes as two people can be. Me—I've always been a loner. A

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dreamer. The *Steppenwolf* type.

Rem, on the other hand, lusted after the limelight and being a celebrity. He was—practical. A secular Elmer Gantry. He'd inherited his father's business skills and libido, but none of the other characteristics that had made Gaius Julius Caesar something of a Renaissance man.

The elder Caesar made his fortune in the new AI market that took off right after the turn of the century. IQ Industries—unofficial motto, "Intelligent machines for not-so-intelligent people"—never was a serious threat to topple the old guard makers of "dumb" computers and software. Once his company showed how inexpensive AI modules could make everything from toasters to trains literally idiot-proof—easy to use and, at least in theory, one hundred percent safe—the others jumped on the bandwagon too and got their chunk of market share.

But maybe Caesar pater would have given Bill Gates Sr. a few sleepless nights if he hadn't rolled over most of his profits into his own pet projects and hobbies. Probably due not a little to his name, Gaius Caesar had a lifelong interest in ancient Roman and Greek literature. One of his fondest dreams was to program AIs to reconstruct lost works from antiquity. Like the dozens of lost plays by Sophocles and Aeschylus. The missing sections of Marcus Tullius Cicero's *De republica*. The hundred-plus vanished volumes of *Ab urbe condita libri* by Titus Livius. Or the four lost *Discourses* of Epictetus. The AIs used existing fragments and summaries of those works, and an exhaustive analysis of the style and ideas in the authors' extant writings and teachings, to produce at least an approximation of them.

"Scholars" of classical culture unanimously dismissed those reconstructions as rubbish. True, there was no way to know how close they came to the originals. But, judged on their own merits, they seemed pretty damn good to me.

What provoked more public derision was the elder Caesar's sponsorship of fringe "science." Gaius welcomed anybody who claimed they'd perfected lukewarm fusion or designed a faster-than-light drive, teleportation device, or perpetual motion machine. Based on what he'd learned from those "non-traditional, new-paradigm scientists" (a.k.a. crackpots), he'd poured millions into building complex AI-controlled amalgams of metal, silicon, and plastic. Unfortunately, none of those machines ever succeeded in generating energy from the ether or transporting anybody to another dimension, much less a distant star system.

When Gaius died during a Viagra-laced tryst with a curvaceous cutie barely out of high school, Rem took over the company and stopped all that nonsense. Those Buck Rogers contraptions were hauled away for scrap, operations were streamlined, and "unproductive" personnel—like me—were ruthlessly cashiered.

Soon the stock price for IQ Industries shot up like a Mars Direct rocket. Worshipped by his stockholders, feared by his competitors, his smug visage gracing the covers of major business journals every other month, Rem finally seemed to have all the recognition and celebrity he'd always craved. Reading that highly sanitized version of his life and the interview he gave when Time named him "Man of the Year" made me sick. Old Dad might've been crazy, Rem sneered, but *he* was a *real* businessman.

What that article didn't say was that fame and power were his strongest aphrodisiacs, and making money his only ideal. Whatever didn't exist now, or couldn't be calculated on a balance sheet, wasn't important to him. I've seen AIs in electric nose hair trimmers with more imagination than he has.

So when Rem starts babbling about time travelers, it gets my attention.

I acted nonchalant. "So what makes you think time travelers are out to get you?"

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Rem loosened his silk tie. "At first I didn't know they were time travelers. Starting last Monday I kept seeing the same twenty or so people wherever I went. If I got on an elevator in my office building, one of them was on it. A couple of them were always standing near my limo before I got in. When I went to one of my exclusive country clubs for supper, a group of them were at the next table."

"Did you know any of them?"

"Of course not! They weren't the kind of people I associate with. They were—peculiar. Living in San Francisco, you get used to seeing people who dress and act a little different. But they stood out from even the usual free spirit crowd."

I glanced over at Mildred. She was pretending to wipe an empty table a few booths away. When she saw me looking at her she gave up her eavesdropping with a sigh, and put a few coins in the long-silent jukebox.

Again I found myself hoping she'd selected an AI-produced composition. But no, it was just another current human-made hit, "Murmurs From My Heart." Twanging guitars and a thumping bass accompanied the melodious baritone of G. F. Ramstant, the cardiologist who now pursued a far more lucrative career as a country-western singer.

"You broke my heart so bad, I can't find all the pieces.
There's a hole in my chest where my left ventricle used to be.
It'd take a surgeon with superglue, and a little help from Jesus,
To fix my achy DeBakey heart for me!"

Rem, sitting opposite me with his back to the front door, didn't see it open and a young couple walk in. They sat down in a booth on the other side of the room. The woman looked about thirty-five. Her auburn hair was molded into a bouffant hairdo and topped by a pillbox hat. The pale sheath-dress outfit she wore reminded me of old films I'd seen of Jackie Kennedy in Dallas a half century ago.

Her companion was a bit taller and older. His gray flannel suit would've looked good on Nixon during his "Checkers" speech. Except his wide tie was wrapped around his forehead like a sweatband. And I don't think Tricky Dick ever sported an orange Mohawk.

Mildred didn't know what to make of them either. After they refused her proffered menu with silent synchronized shakes of their heads, she left the odd pair alone.

Rem didn't notice them. "I started getting worried when I flew down to Los Angeles last Tuesday. There were a dozen of them at the airport before I boarded my jet. Another group was waiting for me at the airport in LA. One of them pulled beside my limo riding a motorcycle when we were stuck in traffic on the expressway."

"Did any of them talk to you?"

"No. All they ever did was—stare at me. Never getting too close, just watching me. Even with my bodyguards right alongside me, I was starting to get a little afraid of them. But somehow I got the impression they were more afraid of me."

The front door opened again, admitting more patrons. A fiftyish man with a circa 1964 Beatles haircut and a ruffled Nehru jacket. A redhead poured into a skimpy miniskirt that might've been taken off the set of *Laugh-In*. A bell-bottomed, platform-shoed John Travolta wannabe, accompanied by the innocent, pre-slut Olivia Newton-John from Grease.

Rem was too immersed staring at a vulgarity some former patron had carved in our tabletop to notice the newcomers quietly take their places in surrounding booths. "When I got back home Wednesday it got worse. I started seeing them, not just in public, but in places where they had no business be-

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ing. The other morning I woke up at home, looked out my bedroom window—and there were five of them looking back up at me!

"I called security right away—but they didn't find anyone. The guards knew better than to contradict me. But I could tell they didn't believe anybody could get over an electrified iron fence, not be detected by the infrared sensor system, elude the dogs patrolling the grounds—and then vanish into thin air!"

Joe, still snoozing near the front door, grunted in his sleep as it opened again. A pre-army Elvis slid his blue suede shoes into a nearby booth, followed by a pill-popping version in a white sequined jumpsuit.

I sniffed. "Sounds reasonable to me. Besides, who would want to break in to that prison you call 'home'?"

Rem's face looked like perspiring alabaster. "Then I didn't see them anymore—but I knew they were there, somewhere, close by. I'd be working in my office alone late at night, and I'd catch a glimpse of one of them out of the corner of my eye. I felt them looking over my shoulder, whispering something in languages I couldn't understand. But when I turned around—nobody was there. Once, while I was alone in the men's room at a restaurant, I'm sure one of them was staring down at me over the top of the stall!"

Several more people filtered in and sat down. Though she was a brunette, the woman at the far end of the room filled her *Seven Year Itch* dress quite nicely. Her boothmate was even more striking. At first I thought she was wearing the thinnest spandex I'd ever seen. Then I decided she was covered from head to toe with a weird rubbery body paint, whose psychedelic colors shifted like a kaleidoscope every time she moved. Maybe that was the latest fashion on the coast this year. Or some year.

Their constant staring at us made my skin crawl. I tried to ignore them and focus my attention back on Rem. "Hmm. Hearing voices. Delusions of persecution. What's that medical term you like to use so much? 'Paranoid schizophrenic'? Sounds to me like you don't need my help. You need a psychiatrist."

Rem, still blithely unaware he was the center of attention, winced. "That's not funny. And they're not delusions. Early this morning—I caught one of them."

"And I suppose they told you all about this fiendish plot to drive you crazy."

"In a way. I woke up in bed about three A.M. It was pitch black—but I could *feel* someone staring at me. I switched on the lamp by my bed—and there he was. He looked like a troll. Short, fat, old-looking, with coarse features. I'd seen him before. He was the one looking down at me in the men's room. He wore a brown suit and was pointing what looked like a camera at me.

"When the light came on he blinked and stumbled backwards. I grabbed him, wrestled him to the floor, and sat on him. I think my cursing and slapping him around terrified him. He started babbling in a language I couldn't understand. Then I realized it was a garbled version of English."

I tried taking another sip of Pepsi, but the glass was empty. "Could you make out any of it?"

"Yes—but it didn't make any sense. He said he'd come from a little over five hundred years in the future, back to the 'Dawn of the Temporal Age'."

"The what?"

"Apparently he believed the first time machine was built last week. His machine and the ones those other people from the future use can't travel back into the past before that first time machine was used."

I frowned professorially. "There are theoretical physicists who've said that, on the remote chance a time machine could be built, it would have that limitation. But why would they be after *you?* Do they think you—or maybe your unborn grandson—is going to become an

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evil dictator who takes over the world?"

I snickered. "That must be it. The Temporal CIA is planning to terminate you with extreme prejudice and make a brighter, happier future for all humanity. What a hoot."

A line of sweat trickled down Rem's clean-shaven cheek. "I don't think that's it. The troll kept calling me the 'Father of Time Travel.' If I understood him right, the reason they're after me is that they think I just invented that first time machine!"

I scratched my beard, rubbing away a little sweat of my own. "Well?"

"Well what?"

"*Did* you invent a time machine?"

Rem looked at me as if I'd just accused him of being Santa Claus. "Of course not! Dad was crazy enough to try building ridiculous crap like that, but I'm not!"

"Then why are these so-called time travelers after you?"

Rem shook his head wearily. "I don't know. Maybe the troll would have told me if I'd hit him a few more times. But I was so disgusted with what I thought were his lies I got up off him and started to phone security. Then I saw him reach for something in his coat. I thought it was a gun, so I ran out of the bedroom into the next room. After I hit the alarm button I peeked back through the bedroom door. He was holding what looked like a wand with a big ruby at the end."

"Borrowed, no doubt, from Glinda the Good Witch of the North."

Rem ignored me. "Then the guards rushed in, and I warned them about the troll. They pulled their guns and yelled for him to come out. When he didn't they snuck a look into my bedroom—then stared at me like I was crazy."

Rem's hands were shaking. "My bedroom was empty."

He didn't have to say anything more. Rem's bedroom is on the fourth floor of the Caesar family mansion. There's only one door in. And the only other way out is through a window of bullet-proof, shatter-resistant glass that can't be opened. From the expression on Rem's face, I knew that window was still intact.

"Maybe the guards were right. Maybe you *are* crazy. Just like the rest of your family. Father a crackpot. Mother dying from—what did the doctors call it?—"systemic lupus erythematosus with secondary psychosis.' And then there's your—"

"Stop it!"

I stopped. If I hadn't, Rem would probably have wrapped his hands around my throat. Every homicidal maniac has a first victim.

The last booth had just filled. The man was attired in jeans and dirty sweatshirt that looked uncomfortably like the ones I wore. Although even I have better sartorial taste than to wear a baseball cap backwards. The woman had on that feather outfit Mona Plenty barely wore in last year's Oscar-winning holo, *Evil Slime Critters from Hell, Part VI.*

Staring at her avian outfit, I suddenly realized another reason why these people were making me so uneasy. The way they'd filtered in a few at a time—it reminded me of that old Hitchcock thriller. One bird landing on an overhanging wire. Then another, two more, until slowly the wire sagged under the weight of a menacing flock—poised to strike at some mysterious signal.

Rem, his attention focused on me and his troubles, still hadn't noticed the twenty-some pairs of unblinking eyes silently staring at our booth. Mildred, cowering in a corner, sensed the shroud of danger hanging over the room as strongly as I did.

But, trooper that she was, she dutifully did her job. These latest customers wordlessly rejected the menus she offered them nervously with the same dismissive hand and head gestures the earlier arrivals had. Then, trying to dispel the smothering tension all around us, she put a few more coins in the jukebox.

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Despite my feeling of impending doom, I still found myself hoping to hear an AI-generated song from the machine. But no, Mildred had selected one of her favorites, a sentimental ballad entitled "Love Among The Stars." Twanging guitars and a thumping bass accompanied a duet by Willie Jay Xerxes and Sonya Pucker, two former astronautical engineers who'd turned to more prestigious careers as country-western singers.

(Chorus) *"Truckin' through the cosmos*
in a starship built for two,
Fuzzy dice hangin' from our Bussard
ramjet,
We'll be thrustin' together in an interstellar rendevous,
Then smokin' a post-coital cigarette."

(Willy Jay) *"There's no two-body problem that we can't figure out,*
Floatin' together in microgravity.
Embedded in each other, there's never
any doubt
Time stand's still, 'cause we're travelin'
close to c!"

(Chorus) *"Truckin' through the cosmos*
in a starship built for two," etc.

(Sonya) *"You have boldly gone where*
no man's gone before,
Explorin' a black hole of ecstasy.
Please cross my event horizon, and
thrill me some more
When you touch my naked singularity."

(Chorus) *"Truckin' through the cosmos*
in a starship built for two," etc.

As the music reverberated through the room I noticed something that made my brain throb with horror. Every one of the unconventionally-dressed people in the surrounding booths was listening to the song. And judging from their misty vapid smiles, they *liked* it!

Willie Jay and Sonya finished their tender duet on a final cheery cadence, filling the room with utter silence. Then, after what seemed like a breathless eternity, one of the strangers quietly hummed the first bars of the song.

That tiny noise had the same explosive effect as a lighted match tossed into a gasoline tank. Rem glanced up—and saw over twenty pairs of eyes staring at him. I'll never forget the look of horrified recognition that twisted his face into something hellish. He looked like a French aristocrat during the Revolution, neck tightly locked in the guillotine, in those timeless seconds of terror before the blade fell.

Then the front door opened again—and the last member of this menagerie waddled in. He didn't look much like a troll. More like a munchkin. Unless, perhaps, you saw him standing by your bed at three in the morning.

As the rotund stranger walked directly toward us, Rem's eyes were bulging, his face the purplish-red of someone dangling at the end of a hangman's noose. I wasn't sure he was going to live long enough for the troll to reach him. Then the little man took out a small gray rectangle and stylus from his pocket. Slowly, hesitatingly, he looked right at Rem and said something that chilled me to the deepest pit of my gut.

"Conferred may I be that autograph of yours, Caesar Mister?"

Rem reacted like a cornered rat fighting for its life. "No! Get away from me! All of you—leave me *alone!*"

He leapt up, knocking the troll aside. The front door swished open, and I saw him run across the intersection outside. Against the light.

There was thudding *boom!* as the bus plowed into him at full speed, sending his flailing body arcing through the air. The bus had barely screeched to a stop over a hundred meters down the street when I reached him. I could hear Mildred screaming somewhere behind me as I looked down at the unmoving lump of tattered flesh sprawled on the street, its expensive suit ripped into bloody

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rags. Rem's face had survived nearly intact, eyes staring up at the clear infinite night sky. But from the twisted angle of his neck and the nauseating way his chest was crushed, I knew he'd never see the stars again.

Then the bus driver, a thin gray-haired woman, was beside me yelling, "It ain't my fault, he ran right out in front of me! I'm going to get me a lawyer!" As her passengers came out to gawk at the body, I eased away. Joe was standing in the back of the crowd staring slack-jawed at what was left of Rem, as if expecting the corpse to jump up and walk back into the bar for a Margarita. Mel, parked beside him, looked even stupider—still clutching his magazine with the buxom centerfold of Miss International Space Station hanging out in all her tartish glory.

And farther back, under the streetlights, stood the flock of vultures who'd hounded Rem to his death. As furious as I was I couldn't help feeling a bit sorry for them. They looked totally disoriented and lost. Like a creationist told by God the Mother that yes, She had evolved men from monkeys—but, except for the hair, didn't see any difference between them. Or finding out everything you've learned in history class was wrong.

One by one that baffled, costumed crew slunk away into the shadows, and were gone. Finally only the troll was left. He shook his head in disbelief, stared crestfallen at the shattered demigod on the pavement, and muttered, "Be how that can?" Then he extracted a wand with a multifaceted ruby on the end from his coat. A slight pressure from his fingertip, and he was gone too.

I started to rejoin the crowd chattering around the body when I saw something lying unnoticed on the dimly lit street. It was Rem's wallet. Must've popped out of his pocket when the bus hit him.

Nobody saw me pick up his wallet and replace it with my own. I hung back in the shadows, watching the mob hover above the mass of cooling meat I'd been talking with minutes ago. Making sure no one else saw the wallet and decided to keep it as a souvenir.

A few minutes later the cops arrived. I was lucky. One of them found the wallet right away.

That was my cue to leave. As I walked by my favorite restaurant for the last time I heard the jukebox inside playing a new song. At first I couldn't figure it out. A quick glance through the window showed the place was still empty.

Then I realized the jukebox's AI must be programmed to start playing on its own after a certain length of time if nobody put any money in it. A little bonus for the customers, something for atmosphere—and to encourage them to pay for the next selection. It was too much to believe the AI had miraculously recomposed the song playing soulfully from the jukebox. But perhaps the AI, somehow sensing the events that'd just unfolded, had made a preternaturally wise choice from its database. The two synthesized voices warbling from the jukebox didn't sound much like Roy Rogers and Dale Evans. But the melody and words were those of "Happy Trails to You."

I think AIs are vastly underrated.

I ordered the AI in my car to get me home as fast as it could. They come from the factory preprogrammed to obey speed limits. But, for those of us who know what makes them tick, it's easy to override those instructions. A highly sophisticated radar detector I'd built kept me "honest".

The car's AI, knowing my tastes leaned toward the classical, locked in on a music channel from one of the direct-broadcast satellite systems. It was playing an obscure Haydn symphony. "No. 64, in A major," according to the display on my dashboard.

Plunging down the highway through the starry night, the symphony's melan-

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choly Largo swirling around me, I was alone with my thoughts. Regretting that I'd never enjoyed those delicious ribs or Mildred one last time. And trying to make sense of the tragedy I'd witnessed.

There was a certain twisted logic to what'd happened to Rem. If someone built a time machine, they'd be famous for all time. A magnet for every time-traveling historian, media-type, tourist—or just "fans" with no lives of their own, coming back to bask in their idol's luminous presence.

Of course, if they came from far enough in the future, their knowledge and understanding of commonplaces like fashion in the past would be a bit spotty. Derived, of necessity, from old pictures and recordings. They wouldn't realize how much the way people looked and dressed in classic movies, videos, and holos differed from the way they did in real life. And they might be off a couple decades in choosing their models.

And if it were impossible to travel into the past before the first time machine was used a week ago, that would explain why those hordes of time travelers hadn't shown up before.

My house was dark when I arrived about 2:00 A.M. As I walked to the front door it sensed my presence and turned on the lights on the main level. A synthesized voice ordered, "Place your right hand against the plate on the door."

I did. The front door opened and the house said, "Welcome home, sir." Unlike Rem, I'd never needed gates and human guards to protect me.

A quick shower and change of clothes, and from the neck down I looked like a busy executive dressed in expensive casual wear, ready for an afternoon on the links. Just like the outfit Rem used to wear on the rare days he wasn't working.

It wasn't easy cutting my own hair. But, using a hand mirror and the large one on the wall in my bathroom, I managed to trim my scraggly curls into a semblance of the blow-dried look Rem favored. My electric razor had a simple AI built-in, and removed my beard relatively painlessly.

As I packed my suitcase another thought came to me. The surprising thing was that so few time travelers had come back to see Rem at his moment of triumph. Maybe it'd been like a press pool. Or maybe humans of the more distant future had progressed beyond primitive obsessions like hero worship or tabloid-level voyeurism.

But more likely those people of the future were, like nearly all my contemporaries, simply idiots. Unthinking fools, obsessed with vapid entertainment and animal pleasures, with no purpose or reflection in their lives. Eloi in a high-tech world, where machines with sophisticated descendents of present-day AIs did all the real work and thinking. Well, at least AIs didn't get hungry.

Or perhaps, in some not so distant millennium, humanity was extinct. That would be a kinder fate.

Then, suitcase in hand, I went down to my laboratory in the basement. A translucent ruby-colored geodesic dome three meters in diameter sat in the middle of the floor. How they ever managed to shrink it down to something you could hold in your hand was beyond me. But, very soon, I'd make them tell.

The panel on the dome slid open, and a dim red glow immediately filled its interior. As I sat down inside at the control console the machine's AI said, "Good morning, sir. Ready for another trip?"

"Yes. Set destination for . . . October 31, A.D. 2521, 1400 Coordinated Universal Time. Latitude 37° 47'45 north, longitude 122° 26' west. I'll let you decide the seconds."

Well, it was as good a time and place as any to start. Besides, I hadn't been to San Francisco for several years.

"Very good, sir. Lukewarm fusion generator is now operational. Programming sequence initiated. Temporal-spatial translation in . . . one hundred and one seconds."

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The LCD screen in front of me flashed a countdown. No need to worry, I told myself. Based on what I'd seen and heard a few hours ago, everything was going to work out just fine.

Except for poor Rem. All his life he'd wanted the limelight, to be a celebrity. Then, when he'd succeeded beyond his wildest dreams—acclaimed throughout the eons as the inventor of the first time machine—he couldn't handle it.

Of course, if he'd had a bit more imagination, he could have figured out how one avoids being stalked and hounded to death by temporal groupies and paparazzi. You travel to the future and *give* the apparently very stupid and gullible people there the secret of time travel before they stumble on it themselves. Make yourself famous among them—a celebrity, a cult leader, or even a media-created divinity. *Deus ex machina tempora*. That had a nice ring to it.

And the first article of faith you give your fawning devotees and disciples is, *No time machine can travel back in time before the first one was used*. With that thought ingrained in their limited minds by the very Father of Time Travel and passed on to later generations, they won't even think about discovering the quantum uncertainty circuit that allows you to travel *anywhere* in time and space. And they won't be chasing after you with their own time machines when, after your jaunt to the future, you travel back to Athens in the fifth century B.C.

Gaius Caesar, the illustrious founder of IQ Industries, had to content himself with AI-generated fantasies about the lost works of the great ancient philosophers and dramatists. Me—I was going to find out what they *really* said and wrote. Maybe argue with Socrates, using a Machiavellian or Nietzschean point of view. Or give them suggestions about what to write. "To be or not to be." I wonder what Euripides would do with *that* line as a beginning.

The machine's AI interrupted my reverie. "Twenty-two seconds to temporal-spatial translation." The muted ruddy light around me reflected countless images of my face off the dome's facets. With its newly trimmed hair and clean-shaven cheeks it looked like a damned soul engulfed in the fires of hell. A ghost come back to haunt me.

It was Rem's face—reminding me that the first thing I had to do when I arrived in the twenty-sixth century was to tell everyone my name. Remus Caesar, prosperous early twenty-first century businessman and inventor of the first time machine. Remus Caesar, whose first jaunt through time a week ago, traveling from one Sunday to the next, had unintentionally started a chain of events that was far from over.

Remus Caesar. Not the man lying cold and stiff in a Kansas City morgue, his body identified from the driver license (its photo taken fortuitously during a rare beardless period) in his wallet, and perhaps a sloppy fingerprint or expert DNA band pattern comparison.

Remus Caesar. Not the erstwhile business partner who'd recognized the few good theories among all the crappy ones Gaius Caesar had collected, and used his own towering genius to develop them to perfection and create the device I sat within.

Remus Caesar. Not his much smarter identical twin, Romulus.

As the countdown on my time machine's monitor neared zero I wondered if it was possible to go back a few days into the past and do something to save my brother. No—too dangerous, too many potential paradoxes. As the ancient Stoic philosophers I'd one day be listening to might say, *Que sera, sera*.

Besides, this way Rem got all the fame and glory he'd craved—even if it was posthumously. And I avoided a fate worse than death. This way, there would be no hordes of time travelers perpetually looking over my shoulder. Or staring at me. Or meddling in my personal affairs.

You see, I'm a very private person.■

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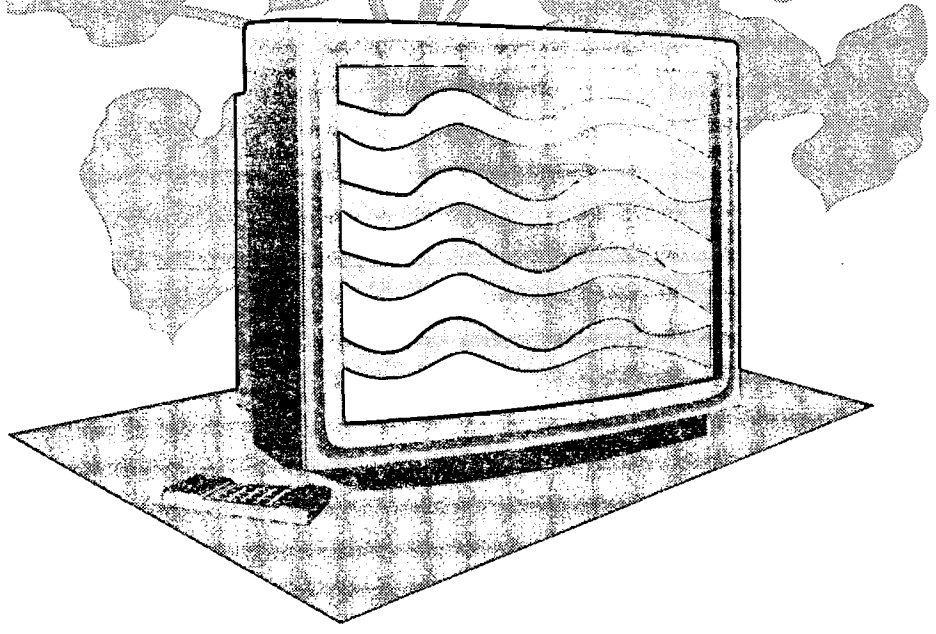
Gordon Gross

OUT OF WARRANTY

*Ever wonder why things always seem to break down right **after** the warranty expires?*



"Damn!" Daniel banged on the top of the TV set. "Marian, do you know where that damned warranty is? TV's on the blink. Again."

"It's with all the rest of them, Danny, just like the last time," Marian's voice came from her office down the hall.

Daniel cringed at the diminutive. Marian only used it when she thought he was acting like an idiot, which he wasn't. This was the third piece of electronics to go south on them in the last six months. Their first year had been so wonderful and easy. Suddenly, into their second year of marriage, all their material goods seemed to be falling apart. And without any new clients, replacing them all was causing more than a little budgetary angst. Correction—without any new clients for him. Marian, at least, had landed enough work in their new home to keep it all together.

Daniel stomped out of the living room

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into his office across the hall from Marian's and stopped dead. Standing in the center of it all fuming, he tried to remember which of the various filing cabinets held the home warranties.

"With so many files, you'd think we'd have gotten around to labeling them by now," he muttered to himself, "but that would be *too* easy." Then he raised his voice to get Marian's attention, "We are going to go through this, finish unpacking, and label all this crap this weekend. I can't live like this, Marian. It's driving me nuts."

Marian declined comment, which ratcheted Daniel's ire up another notch, but he put his anger into the search. He knew the mess wasn't only Marian's fault, but, dammit, it seemed like he was the only one who wanted keep their house organized. What was the point of moving out of a one-bedroom apartment in the city into a house if it didn't make it easier to organize everything?

Daniel located the folder he wanted in the second drawer of the third filing cabinet. He flipped through the file's contents. "Microwave, toaster oven, stereo, old TV, ah *new TV.*" He pulled the warranty card out and turned it over, trying to find the active dates. In the middle of the fine print he eventually discovered the expiration: two days ago. "Damn, damn, damn! I *knew* it! Marian, they did it to us again!"

"We're out of warranty?" Marian's voice was flat. Expired warranties were becoming an all too common theme.

"You got it."

Marian came to the door and stood uncertainly. Hovering, Daniel figured, until she could be sure that his frustration was directed at the TV company and not at her. She chanced a suggestion, "Maybe we should start getting the extended warranty, Daniel. The repair bills are killing us."

"Those things are just rip-offs," was Daniel's instant response. "You've read the same reports that I have. We're just hitting a bad run, that's all. If we got the extended warranty, you know these things would never break down, and the money would be wasted. And it's not like we've got the money to waste."

Marian rolled her hazel eyes. "Whatever."

"I'm going down to Roy's Repair with that hunk of crap. I don't want to be without a TV this weekend. I am not missing my shows."

"We could spend some time with each other," She reached out and brushed some of his silvering, black hair off his forehead and let her hand drop down behind his ear, scratching seductively.

"We can do both." He stepped into her embrace, grateful for her calming effect.

"I guess," Marian sighed. "In the meantime, I've got work to do. Programs don't write themselves. Why don't you go fight with the demons of electronics, and I'll stay here and earn the cash to pay for it."

For a moment Daniel considered a nasty retort, but realized the comment was innocent. "Save your money for the phone company," Daniel said, heading for the living room. "I think I can still barter with Roy."

"Back again?" Roy's voice greeted him as he lugged the twenty-seven-inch delinquent through the door.

"Yeah. Wanna give me a hand?"

Roy came from around the gray linoleum counter and the two maneuvered the TV and onto the shop counter in the back of the shop.

Roy was amiable enough, and knowledgeable enough, but Daniel found Roy's concept of cleanliness a challenge. Roy's matted brown hair and dingy teeshirt completed the ambiance of the ward room, as Roy referred to it, nicely.

"So, what seems to be the problem this time?" asked Roy.

"Take a guess," Daniel said.

"Warranty ran out?" Roy guessed, a little too brightly for Daniel's taste.

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"As usual. It's like they know," Daniel shook his head and tried to keep his temper. "Not that I don't think you're a good guy, Roy, but I'm getting sick of this. I see you more often than I see my own mother."

"I keep telling you, Daniel, you should spring for the extended warranty. Trust me on this. It'll save you a load of heartache."

"Marian's even started mentioning it," Daniel said. "C'mon. They're a scam. Soon as I buy it, the stuff'll run fine."

"That a fact?" Roy smiled and shook his head as he undid the front panel on the TV so he could start working on it. "So we doing this on barter or are you paying in cash?"

"Well, how's your computer doing?"

"Better than your TV at the moment," Roy laughed. "I got the extended warranty."

"Thanks," Daniel said. "I was running low on bullshit today."

"Actually it could use a look. Thing keeps freezing when I run that inventory report Marian wrote. It was running fine till yesterday, and then it just choked."

"Forgive me if I say it serves you right," Daniel said. "I'll take a look at it. Sounds like a memory problem."

Roy's computer area was a direct contrast to the rest of the shop. Everything was in neat piles or labeled folders. Not a speck of dust in evidence. Daniel sat down and wiggled the mouse to end the power saving mode. The screen brightened with the crackle of static electricity.

He began running the report macro Marian had written, trying to duplicate the problem. On the first lockup, he felt a perverse satisfaction that the great handy-man's computer wasn't invulnerable. After several slight tweaks to the memory configuration, Daniel managed to run the report without incident. He ran a printout and copied Marian's add-in to a disk from the caddie in the top drawer.

"You're all set, Roy," Daniel said on his way out. "I'll run the problem past Marian, but I don't think you'll lock up again. I borrowed a disk and a sample report to show her, just to make sure."

"Thanks," Roy said, looking up from the television. "I hate to tell you this, but your news is better than mine. I need to send out for parts. Should have it back to you by Monday afternoon."

"Monday?" Daniel groaned. "C'mon, Roy, you gotta have some parts you can get from somewhere."

"Danny Boy, you're one of my best customers," Roy said. "I would if I could." His eyes glittered, more with humor than sarcasm.

"Yeah, yeah, I know," Daniel said. "I just was really looking forward to my shows."

"You sound like some housewife with her soap operas," Roy said.

"Give me a break," Daniel said. "I don't suppose you'd like to invite me over for the season finales?"

"I got company coming this evening," Roy said. "The kind that demands a one-on-one approach. Besides, I don't watch the kinda alien voodoo sci-fi crap you do."

"Crap?! You think I watch crap?" Daniel laughed. "That's a hoot with the junk you watch."

"What's wrong with westerns?" Roy said. He almost sounded offended.

"Never mind," Daniel said. "I'll just make a few calls. Someone has to be home this evening who has some taste."

"Just make sure they bought the extended warranty," Roy's laughter followed Daniel as he left the back room.

"C'mon, Brian. So your wife's got the bridge game this week," Daniel pleaded, "We can watch in the kitchen. It's the season finale. C'mon. It's your fault we ended up moving out into the sticks here. Do me a favor. Fine. No, I understand, I'm just getting desperate. Everyone is either busy or out of town. I don't suppose your VCR is available.

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Yeah, well it would be opposite Jane's taping schedule, wouldn't it. No, ours is belly-up, like everything else these days. OK, thanks anyway." He hung up the phone.

"Still no luck, Daniel?"

"No. I can't believe this. I've been waiting for this for weeks. Maybe I'll just go and get a small portable. I could always return it next week."

"Do you have any idea how ridiculous you sound, Danny?" Marian's eyes glittered with mirth.

"I don't care," he answered, smiling. "I'll be back. I'm just going to run to the store. Oh, by the way, I had to troubleshoot Roy's computer again. That inventory program locked up when he ran a report. I tweaked his memory and I think that fixed it, but I brought home a copy of it and a sample report for you to check. The way things are going, it won't hurt if he owes us a few hours in trade."

"I'll try to take a look at it while you're out."

"Thanks. And thanks for not stopping me." He leaned over the phone table and kissed her before dashing to the car.

"Would you like the extended warranty with that?" My Name is Bob, Can I Help You asked. "Only another $39.99 for an additional year's coverage."

"No . . . uh, wait," Daniel's conscience got the better of him as he stood before the pimply-faced clerk who'd just sold him the portable TV. "Actually, what the heck. Go ahead and put it on there."

"Now I do have to tell you, the warranty's not refundable," Bob said, suddenly businesslike, "but it's a good investment."

"That's OK." *Fine. I got the warranty. Even if I return it, I've paid for the use.*

Bob picked up the handset and hit the intercom button. "Carlos, bring me a up a 325JXT with a one year."

"I'm back," Daniel called down the hall as he hauled the box into the house.

"Find what you wanted?" Marian's voice answered.

"Yes, I even got the extended warranty."

Marian came out of her office, "Oooh, I love it when you talk dirty."

Daniel walked into the living room, and Marian followed him. "OK, drop it. I figured it was a way to pay for the rental when I return it on Monday. Did you get a chance to look at the program?"

"Uh, yeah. It's fine," Marian said. "Roy was just dithering with it a bit, creating some hidden data. Played havoc with my macros, the hidden cells were sometimes becoming protected. When it couldn't write to them, the macro would lock up."

"What would he need to hide in his own inventory?" Daniel asked as he excavated the packing material. "It's not like he has any employees. Maybe he's looking at an IRS audit. Or maybe he's fencing stolen goods?"

"Can you say 'overdramatic'?" Marian asked. "All it said was 'Extended Warranty Kits.' I can't believe it's any big deal."

"Sounds innocuous enough," Daniel agreed. "Maybe he did it by accident—you know, a guy with a little knowledge and all that. Did you reset it?"

"Yeah, it's all done. You can bring it back and upload the code when you pick up the television. It'll automatically unprotect and unhide everything when it runs. Check with him first, though; maybe he does want the column hidden."

"Will do. Now if you don't mind, I have a TV to set up."

"We really do have to get you a better hobby and a new contract to keep you busy."

"Roy?" Daniel's voice echoed off the walls, but he got no answer. When he got to the counter, he saw a note taped to the register: "Back in 5. If you need me, I'm over at the Dew Drop grabbing

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a sandwich. Leave broken appliances on counter if you can't wait." A pad and pen waited by the note for those who couldn't wait. *Ah, small town life,* he thought. *I'll just get the computer stuff done before he gets back.*

Daniel headed for the back room. The lights were still on and electronics were in various stages of postmortem on the work benches. An eerie feeling crept up his spine, looking at all of the mute patients.

He continued past the operating tables and settled into Roy's seat. After awakening the computer from its power-save slumber he copied the add-in from the floppy back to the internal hard drive, over-writing the existing one. Then he opened up the program to do a test. It didn't lock up, and the report looked all right to him. He saw the row for Extended Warranty Kits that Marian had mentioned. It listed bin 49.

Curiosity getting the better of him, and Roy still not being around, Daniel wandered around the shop shelves looking for the proper bin. The bins didn't seem to be in any numeric order, but he soon spotted number forty-nine on a high shelf.

Roy must be taking a long lunch, thought Daniel, *been more than fifteen minutes since I came in. Wonder if Joan over at the Dew Drop was his Friday night one-on-one?* He pulled over a rolling step ladder and climbed up. The tune of squeaking metal was loud in the silence making him wince guiltily. The bin was at the edge of his grasp, but he managed to tease it out with his fingertips and lower it down.

Inside were twenty or thirty little black boxes each embossed with a single digit: *1*, *3* or *5*. The little boxes were heavier than he expected, but when he shook one, it didn't seem to have anything in it. For that matter, there didn't seem to be a way to open any of them. He kept one out to ask Roy about and put the bin back on the shelf. From the front of the shop, Daniel heard footsteps.

"Roy, that you?" he shouted as he climbed back down.

"That's me," came the answer. "Who's back there? Gonna have to charge you more for a tour."

"It's me," Daniel said, meeting Roy out by the counter. "I've got a pass, remember?"

"Oh, Daniel. No problem then. Got your set ready as promised."

"I've got your program ready as promised. Seems you had hidden some stuff that was screwing with Marian's program. She's unhidden and unprotected the info, but if you don't want it that way, let her know and she'll work around it."

"Oh, well, I guess it doesn't matter. I was just fooling around. I should know better," Roy said. "God, I hate it when people bring me their messes to clean up after they try to fix stuff."

"I gotta ask you, though," Daniel said, holding up the box with the *3* on it that he had taken from bin 49. "What's this thing?"

"Jeez, Daniel," Roy said. "What're you doing going through my stock?"

"Sorry. I was just curious," Daniel said. "So what is it?"

"Just what it sounds like, Danny Boy," Roy said. "An Extended Warranty Kit."

"So who do you sell them to?"

"I'm the supplier to the appliance and electronics stores for this area. Mostly the smaller shops. Department stores and chains have internal distribution."

"C'mon, Roy, what the heck is this? I can't even see a way to open it."

"Give me a break," Roy said, exasperated. "They're just inventory markers."

Daniel stared at Roy unconvinced before handing him the box. "Fine, whatever. Where's my set?"

"Over here. How many hours did Marian spend on the program?"

"Figure two." Then, trying to lighten the odd pall that had descended on their conversation, "Don't suppose you'd like to buy an extended warranty for that program now, would you?"

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"Real funny, Daniel. I owe you guys an hour. Put it on my tab."

"It was the strangest thing. All these little black boxes with numbers on them. You'd think it would be some kind of service kit or something, but it was just these bloated mahjong tiles."

Daniel slid over to be closer to Marian on the bed. The glow of the small portable flickered over them like blue flame. "And then he got all weird when I asked him about it."

"So snoop around next time you're on his computer," Marian suggested.

"Marian! That wouldn't be ethical."

"Yeah, but it would satisfy your curiosity. Heck, there are some other files on the diskette of his that you brought me. You could take a look before you take it back."

"I left the disk with Roy," Daniel said.

"Honey, I put the update on a fresh disk. I always do when I send something to a client. I just forgot to give you his back. It's in my client caddie."

"It still wouldn't be ethical," Daniel said.

"I know you, honey," Marian said. "Curiosity is like a disease with you. Why do you think you're so good at what you do? You won't let any problem get the best of you—especially when there's a machine at the root of it. You know you'll drive yourself crazy until you figure it out, and you'll just annoy the hell out of me." She grabbed his thigh in emphasis.

"I don't know what you're talking about," Daniel said, the picture of innocence.

Marian just shook her head.

Besides the original copies of the program and the report, Roy's original floppy disk only had a few pieces of email. One was a large text file with a series of jokes; some of them were even funny. The other was from the supplier for the Extended Warranty kits, a TimeManage, Inc.

Never heard of them. All the note mentioned was a procedure for the insertion of the latest kits into the rear of the appropriate appliances. He'd have to check the new TV later. *Wonder what else they make?*

Daniel, the scent in his nose, opened his browser and searched for TimeManage. He ended up with a minimal number of hits referencing logs and training departments. Nothing about the company he was searching for.

"OK, let's broaden this out a little." He tried searches on 'warranties' (353,894 hits), 'warranties AND appliances' (22,889 hits). Limiting the last by 'TV' didn't significantly diminish the sludge he would have to dig through, although he tried for half an hour before the burning in his eyes and the bunching in his back forced him to stop.

"The email!" Forgetting the pain, Daniel dug down into Marion's diskette caddie and located Roy's original diskette. He opened the email into his word processor. "Dammit!" There was no header to the email, only a To:, From: and the text itself. No way to trace the home server.

Bleary-eyed, but not yet beaten, Daniel switched to full-gut mode. "OK, you're not easily found. I'll buy that you aren't available to the public, but I can't believe you're not connected to the net somewhere."

Daniel began typing in URLs. Among his first few failures he found a management product company with no relation to warranties or appliances at all, and a Chinese company without enough pictures to tell him what they did. The rest only received 'A connection to the server could not be established.'

"Blast! OK, let's think outside the box here. Maybe you aren't on the web-proper." He began typing again: service.timemanage.com; service.time.manage; time.manage.com; timemanage.inc.com; time.manage.inc.com. The final URL brought up a page that re-

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quired a username and password. The banner across the top: TimeManage, Inc.

Rather than trying to hack the system, not one of his top abilities in any event, he looked instead for a way around the security. "OK, let's see what pages you have in there."

Daniel began typing in page name addendums to the server address: welcome.html, welcome.htm, home.html, home.htm, and several others that received the time-honored: 'HTTP/1.0 403 Access Forbidden.'

"What about directories?" Daniel's mind and adrenaline were pumping. 'time.manage.inc.com/vendors' received 'Directory Listing Denied. The virtual directory does not allow contents to be listed.'

"At least I got you to kick a bit. Fine, I give . . . for now."

Daniel copied the server name and path onto the email from Roy and saved it for later reference. Also on the disk was the old version of Marian's program for Roy. He usually preferred hardware and interconnection problems to programming, which was just as well because Marian hated hardware and networking issues. Today, however, Daniel was itching for some satisfaction and the program provided another challenge.

He opened up the application to take a look at it, and to see if he could figure out what Marian had needed to fix. Heck, he had, on occasion, reverse engineered some of her programs. Sometimes the best way to learn how something worked was to take it apart. Roy made a bundle on that theory.

Daniel unhid all the sheets in the workbook to get at the code. After a half hour of scrolling down and jumping back and forth between subroutines to follow the logic, Daniel got stuck on a section of code with a variable counter. He had no clue what its function was. Eyes burning from staring at the screen, he gave up on his quest for better programming through decomposition. He'd just have to admit defeat and ask Marian to explain later.

Daniel headed out into the living room to spend some quality time watching the tube and to await Marian's return from her client.

Turning on the new portable, Daniel remembered the letter from TimeManage and the Extended Warranty Kits that he had found in Roy's bin 49. He turned the set off, and twisted the new portable around so he could see the back. Daniel had never paid much attention to the back end of his televisions. The most he'd ever done was hook up the cable or VCR. Looking carefully, he noticed there were a few odd openings in the cabinet. One, in particular, matched the size and shape of the boxes he'd found in bin 49. Inserting his finger into the hole, it felt completely smooth on the sides. As he poked around at the very back, though, he felt a pinprick. Not deep enough to draw blood, but enough to clue him in that shoving his finger in there was a stupid idea.

He could hear Marian's voice, "Stop monkeying with the stupid thing and just ask Roy."

Roy was at lunch, the sign and pad in their normal place. Of course if Daniel were completely honest with himself, he wasn't really looking for Roy. Despite Marian's voice he wouldn't have shown up around lunch if he really wanted to see the repairman. What he really wanted was to check out those kits again. Making sure that Roy wasn't just about to walk back in, Daniel slipped into the back room and headed for the shelving on the opposite side of the room. Bin 49 wasn't on the top shelf anymore. Ah, a puzzle, and puzzles were meant to be solved. Where were these bizarre kits and *what* were they? It had begun to eat as his better sense.

Daniel searched for the missing bin. In a corner on the bottom shelf, he found it. The black tiles were still nestled in-

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side, a jumble of *1*'s, *3*'s and *5*'s. He picked up one and reexamined it.

Suddenly the sound of the door at the front of the shop opening broke his concentrated silence, surprising him. Impulsively, he shoved the tile in his pocket rather than back into the bin and made his way back toward the computer.

Daniel sat and in the same motion moved the mouse barely in time to get the screen back before Roy walked in.

"Daniel? I wasn't expecting you back. TV's OK, isn't it?"

"The TV's great. I didn't realize that Marian puts program updates on new floppies so I just came by to bring you back your disk. I noticed you had some files on it, and thought you'd like it back."

"Oh," said Roy, taking the disk when Daniel handed it to him. "Thanks."

"Gotta get back," Daniel said. "So I'll catch you later. Oh, I must have misunderstood Marian, by the way. She only worked on your program for an hour. So we're even." *That ought to cover his cost on the kit,* Daniel thought.

Sitting in front of the computer, Marian watched Daniel scroll back to the routine that he didn't understand.

"You see," Daniel said. "Right here, there is a counter. That much I get, but I don't understand why."

"How did you find this?" Marian asked.

"I unhid the code like you showed me."

"You learn too fast for your own good, network boy," Marian said. "OK, Daniel, I'll tell you what all of this is, but you promise to still love me after?"

"What? Of course I'll still love you. It's just a program, for chrissake."

"This is a embarrassing, but with all the money problems we've been having, and everything breaking down . . . well anyway. The counter is tied to a random generator to set its limit. When the limit is hit, this counter takes over outside of the system and counts the number of changes made to the system configuration. After a random number of changes set here between these two limits, the system is restored."

"Are you telling me you programmed this to break down?"

"You promised, Daniel," Marian said. "It's done all the time. I found crap like this in other people's code that I've inherited. I know it's not right, but we needed the money. When we're out of the woods, I'll clean it up. I'm sorry, but that's the truth."

"Truth or not, it's unethical," Daniel stared at Marian.

The look wasn't lost on her. "Unethical or not it helped pay the mortgage this last year while you were trying to land new clients." Her words were quiet.

Daniel flinched physically, the truth of the situation stinging. It had been his idea to move. Well, mostly his idea, and they *were* tripping over each other in the apartment. He had been sure the risks to their income were minimal. Who would have guessed how hard it would be for a man with more than ten years of experience to get work in his chosen field?

"I'm sorry," he said. "Just promise me you'll stop including the code in your work. We don't need it any more, OK?"

"All right," Marian agreed.

Daniel touched her face, and then pulled her down into the chair with him for a hug. The upset melted away as they held each other.

When the moment passed, Daniel jibed, "You ought to speak to the warranty people, they'd love you . . . " His eyes suddenly grew wide and he reached into his pocket to remove the tile from bin 49. A white five stood out in contrast to its black surface.

"Marian, where's my book? I need to call Tony."

"It's in the kitchen drawer. Why?"

"I think I have something he'd love to check out."

"Daniel?"

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"Yes?"

"This is Tony Allen, over at the U?"

"Tone, you're the only Tony I know."

"Right. Well, I looked at that box thing . . . "

"And?"

"And, I can tell you that it's a delivery system, but I can't tell you for what. The pin in the back of your TV could be used to pierce the shell, but I can't tell you why. I opened the box and didn't find anything. Maybe these are just some sort of place holders."

"That's what someone else said, but I don't buy it. Thanks for giving it a try, though. I'll stop by and pick up the tile tonight."

"Uh, about that. It kinda seems to be missing. It was in the materials lab, but it's gone. One of the cleaning guys probably thought it was garbage. I hope it's replaceable."

Damn! "Don't worry about it," Daniel said. "Thanks again, Tony."

"You're welcome." The sound of the line disconnecting clicked in Daniel's ear.

"Where is it?" Daniel was in front of the computer searching for the files he'd copied from Roy's disk and his amended address for TimeManage. Marian must have been on another organizing binge with the directory structure. There it was—the email from TimeManage. He opened the file and copied the company's server address time.manage.inc.-com with 'support@' on the front of it into his mail program and then created a new email requesting help with a Warranty Kit. He put his name, address, and phone number at the bottom of his message.

"When all else fails, ask," Daniel muttered as pressed the send button. The motto had served him well so far for network problems and it wasn't like *Roy* was very forthcoming with any answers.

Three weeks passed, and still Daniel hadn't heard from the company. He was beginning to believe that they wouldn't answer, but he hadn't lost hope yet.

He went to the new portable TV, still in residence and now unreturnable, to watch the morning news while he dressed. It wouldn't turn on.

"Shit! Here we go again," Daniel said. *So much for the thought that purchasing the extended warranty would quarantine problem-free operation.* "Marian, the TV's on the blink. Do you have time to take it to Roy on your way to your meeting with Sarras?"

"Sorry, hon, they're expecting me early today."

"All right, never mind, I'll do it myself. Nobody's expecting me at any particular time today over at Coriolus. Steve just wants me to drop off a new proposal by end of day."

"At least it's still under warranty," Marian said as she kissed him on her way out the door.

"Hey, Daniel," said Roy. "Been expecting you today."

"Expecting me?"

"Your TV's bust, isn't it?"

"How in the hell did you know that?"

"Well, there's the fact that you're standing there holding it—" Roy started.

"Smart ass."

"—but I had a feeling," Roy continued, ignoring Daniel's interruption. "C'mon back, Daniel."

The two walked into the back room and set the TV onto a workbench. "Finally, I got a set that went belly up when it was still under warranty. Hell, it isn't even out of its original warranty. I called the dealer, he said you were the authorized fix-it man for them. A happy coincidence, no?"

Roy was shaking his head. "No, Daniel. No coincidence. I got a letter for you from TimeManage today."

"For me? Why the hell would they send you a letter for me?" *Why not just email me back?*

"Read it."

Daniel opened the letter that Roy

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handed him. Inside the envelope was a warranty card.

"Why'd they send you a duplicate warranty? I could have brought it down if you needed it."

"Read it more carefully, Daniel."

On a second look, he realized it was slightly different than other warranties he'd seen. The color of the paper was different, and the wording was odd. Then he focused on what was actually being warrantied: Daniel Bates.

"Is this some kind of bizarre humor?"

"Nope, it's the truth," Roy assured him and then handed him what looked like one of the items from bin 49. "Here, hold this."

As Daniel took the box Roy closed his hand around Daniel's. Daniel felt something cut into him before Roy released him. "Damn Roy, you need to cut your nails," he complained. "You just cut me."

"You wanted to know about the kits, right?" Roy asked.

"Yeah, but what does that have to do with it?" Daniel asked.

"Well, I can tell you now. That paper ensures it."

"I'm still not following, but tell me anyway."

"The kits contain nanotech machines, molecular-level robots that keep appliances working. If you don't buy an extended warranty, the nanomachines are deactivated and the appliance automatically breaks down sometime shortly after.

"That's fucking insidious," Daniel said. "Planned obsolescence."

"No," Roy said. "'Not planned. Without maintenance 'bots the appliance might continue to function indefinitely, but if you're not paying for 'em, why should they keep fixing problems? Of course, they could just as easily start causing problems after the contract runs out, but they don't do that unless there's special circumstances."

"How can you be a part of such a program?"

"Someone was going to," Roy shrugged. "Might as well be me."

"What's this card have to do with it?"

"If you read the fine print, you'll see that you have a renewable one-year warranty. The human body is really just a very complicated machine when you think about it. If you don't pay Time-Manage every year, on time . . ."

The blood drained from Daniel's face as he finished

Roy's statement. "My warranty runs out?"

"You got it," Roy said. He didn't even look uncomfortable.

"That's impossible . . . ," Daniel began, then he stopped and looked at the tiny cut on his thumb. "You sonuvabitch," Daniel whispered.

"Hey, it's nothing personal," Roy said. "And it's not like the warranty is unreasonably priced. They've even got a plan where if you pay three years in advance, you get a nice discount."

"Which I'm sure will be null and void if I try to go public or anything," Daniel said.

"Sounds about right."

"And it's not like you've left me any options," Daniel said.

"Hey, you got this all wrong," Roy said. "Why are you acting like this is a death sentence or something? If you keep the warranty paid up, you aren't going to have any problems."

"Yeah, right."

"It's the same plan I'm on," Roy said. "And the payments sure are a lot less than what I used to pay for health insurance. In fact," Roy continued gesturing to another box and letter on the counter next to him, "there's even a family plan."

Daniel looked at Roy.

"Look at your finger," Roy said.

Daniel looked down at his thumb. The cut was gone. Not even a scab.

"What the hell?" Daniel said.

Before Daniel could ask any more questions, Roy turned to the workbench, "Now about your TV . . ."■

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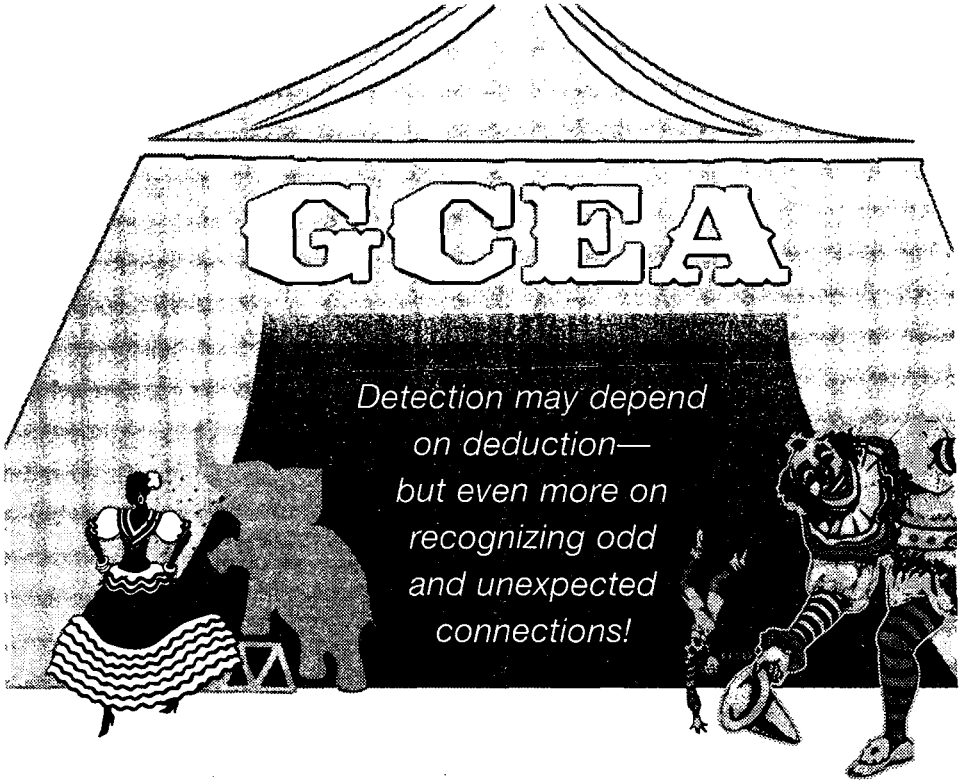

"Id iss nod, you underztand, a zircus," Gerhand Vilkis said. "But ve live in degenerate dimes, Knave. Peeble—many peeble do nod appreciade ze divverences, zo ve call id a zircus."

I shrugged, and gave him a friendly smile. It was the smile I save for madmen and other bothers, and he gave me one back, a little spasm of a thing that showed about three teeth. "Call it a telephone, for all I care," I said. "The important thing is, how is the data leaking?"

"Id iss," he said—no, the Hell with it, you've had a taste of the accent, and I won't bother either of us with it any more. Gerhand had been born on Groschen, and every damn Gross seems to hang on to the accent forever. He'd lived on eight or eleven different planets, and worked on forty or fifty, but he was going to sound like a Gross until he keeled over. Maybe it made him more plausible, or at least maybe the Intelligence Officer who'd set him up on Pupil III *thought* it made him more plausible. Are circus people more likely to sound Gross?

At any rate—"It is," he said, "a carnival. Not a circus, but a carnival. Why should I call it a telephone?"

"Damned if I know," I said. "The question is—"

"Data," he said. "Yes. Indeed so. Data. We must discover, Knave. It is vital that we discover."

I gave him another smile, a little less bright. "I suppose it is," I said. And what the Hell, maybe it was.

It was vital, at least, to Gerhand Vilkis—and vital (she had assured me) to Cecily Scriber, the Intelligence Officer who'd called me up, during a brief stopover I'd made back on Earth for restock, to offer me a job.

"The last job you handed me," I'd told her, "caused me a great deal of pain, ruined my clothes, and didn't pay enough."

It hadn't been all that horrible—

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though during the thing, which I've reported on somewhere or other, I had thought of having cards printed up that read, in addition to *Gerald Knave: Survivor—Incompetent Spying Done Cheap*. But bargaining should always start strong.

"This is different," she told me. "It should be entirely a mental exercise. You *can* deal with a mental exercise, can't you, Knave?"

No need to get nasty, of course; but Intelligence types do seem to run to it. One day Cecily and I might become friends; but we'll have to be very, very old, and very, very feeble, to manage to get together without striking sparks.

"*You*," I said gently, "called *me*."

"True," she said. "All too true. Shall we discuss terms?"

"Let's," I said, "discuss the job first. If I'm going to figure out how much I need to be paid for something, I want to be as clear as possible on just what the something is."

"There is an intelligence operation running on Pupil III," she said. "The details of that operation will be made clear to you on your acceptance of the—"

"Pupil III?" I said. "I thought the damn war was over by now."

"The war has been over for six years," she said. "That is why—at least in part—I am running an intelligence operation there."

"General Stern has started another uprising?"

"General Stern is in prison," she said frostily. "Due in part to your work, I suppose, seven years ago. Minister Anthetor was able to form a stable government, and Pupil III is currently at peace."

"There's no fighting going on?" I said.

She shrugged. "Well—major factions are not involved. Yet. But there are sympathizers, of course. Stern and his gang were defeated—shot, imprisoned, driven off-planet, it varies—but sympathizers always remain. We must keep an eye on them. Hence—"

"Hence an intelligence operation," I said. "A handy eye. And it's running into trouble somehow?"

"Information has been leaked," she said. "The operation itself is obviously compromised—"

"So shut it down," I said. "If they know about it, whatever the Hell it is—"

She sighed. "Knave," she said, "you do not appreciate subtleties."

"All right," I said equably. "What subtleties am I not appreciating just at the moment?"

"If the operation is shut down," she said, "the—the Stern gang, whoever is currently at the head of the group—will know that their infiltration has been discovered. If, on the other hand, the operation continues, they will feel confident—one-up, as it were: they will have a pipeline to information—a pipeline of which, they will be sure, we have no idea."

"But it's still a pipeline to—" I started, and then my brain kicked in. "Oh. You can feed them false information, and they'll take it as genuine—"

"If," she said, "they do not know we know of their infiltration—and if, as well, we know how the infiltration is being managed."

I thought about it for a second. "Why do you have to know that?" I said. "You can feed false information into the operation pretty much ad lib, and—"

"Our people must know which is the false and which the true," she said. "Information control must be clear and absolute. The pipeline to our opposition must work smoothly—and must contain only the false information. In order for all that to be the case—"

"You have to know just what and where the pipeline is, and how it works," I said. "All right: it does sound like a quiet job of analysis at that. Just take a look at the thing, in detail, and see what's going on, in detail."

And we agreed on a price—not a very high price: intelligence people don't pay nearly as well as you think they're going

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to—but a price that could be paid in nice, untraceable Pupil III cash, and would thereby be the Hell of a lot larger, because Comity tax officials would never have to be told about it.

My rule is, never tell a tax official anything you are not forced on pain of death or severe damage to disclose. Life is much more pleasant that way.

So, off I went to Pupil III—landing at the spaceport, which is on the outskirts of a city called Arthur, which I'd visited once before, and wandering slowly and casually out into the countryside, and down a river to a port city called Knessel, where the Four Mile Circus was currently based.

A nice, quiet job of analysis. And the first thing the job did was almost get me killed.

I told myself at once that I couldn't blame the Stern sympathizers, whoever they were, for my brush with the Great Beyond. I have tried, with fair success, not to blame me, either—yes, I was a little careless, but I blame that, when I'm feeling cheerful enough, on a natural lack of acquaintance with circuses.

Pardon me, carnivals. Gerhand kept telling me there was a difference, and I'm willing to believe there is; but I'd never run into either one before. They're popular on some worlds, including the old Original, but, what with one thing and six others, their orbits and mine had never before intersected.

Carnivals, then (according to Gerhand, and why not believe him?), tend to lean more to sideshow acts (I'll explain in a minute), games of chance (usually not quite as chancy as they look to the uninitiated) and the like; circuses tend to lean more to performers of all sorts—acrobats, wirewalkers, highflyers, clowns—and animal acts: trained beasts of any and every sort.

But it's a matter of lean, not a firm line. Circuses sometimes feature sideshow acts, or even the occasional game of chance; carnivals often have an animal act or two, and a scattering of performers, especially highflyers and clowns.

Two fast footnotes. 1) Sideshow acts are one- or two-person shows put on for small audiences at an extra fee (you pay to get into the carnival, and then you pay a little more to see the sideshow acts): magicians, fire-eaters (a minor act on most worlds, but very popular on Pupil III, for some damn reason), a variety of human oddities like very fat people, very thin people, people who look like dogs or turtles or something else just as unsettling—anything you might be willing to pay money out for, to stare at a while.

2) Animal acts—exhibitions of trained beasts—range in size from elephants to fleas. Through the years, people have trained damn near anything, apparently, and though the Four Mile Circus (carnival) carried only an elephant show, some trained walking-trees and a flea circus (which is never called a flea carnival, possibly because fleas don't have side-shows or games of chance), Gerhand told me of circus acts he'd either run into or reliably heard about that included tigers, crocodiles, and—though I would have to see this one to believe it—Rasmussen's biting saurians.

None of which turned up during this little job of quiet analysis—and none of which were needed. The damn elephants did just fine all by themselves.

I'd shaken hands with Gerhand (his was small, horny and hot) and decided to soak up some atmosphere—get an idea of how the Four Mile Circus operated. I already knew how the information transfer to Cecily Scriber and her intelligence net operated—by coded pulse from Gerhand's office to an operative, or spy if you like simple words as much as I do, based about half a mile off, in a small residential hotel where he worked at a nice, undemanding kind of job—assistant manager, I think it was. He'd been an operative (spy) for Cecily Scriber for twelve years or so; Gerhand

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Vilkis and the Four Mile Circus, on the other hand, had been in her pay only eight or nine Pupil months (say eight and a half Standard), when she'd somehow or other managed to snaffle him, and a few of his employees, into collecting bits of data for her and passing them on.

I'd look into the pulse setup later; but the show was revving up to a start, and looking that over seemed the best opening move.

So I went out into the midway—which is a carnival's main street, just a very, very broad lane flanked by tents. The tents feature acts of all sorts—I passed a magician's tent, not yet trying to rope in customers, with a flea circus across from it; then there was a sort of mad athlete—a fellow who could tie knots in himself, and was busily beginning to do that, for five or six admiring or sickened gawkers. As I passed, he unknotted himself. He picked up a ukulele, of all the damn things, and began to tune it (which meant nothing to me, at the time), and played six or eight bars of something or other, very lively stuff. Then he grinned, held the ukulele, and started to tell the gawkers that *much* more surprising acrobatics would take place inside the tent, for a small fee which would be collected by the friendly fellow standing right there in front of it. . . .

Across from him was a kind of Female act, which had drawn a lot more than five or six gawkers, none of whom were looking even faintly sickened. It's another standard feature of carnivals, Gerhand had told me—dancing girls (dancing women, if you subscribe to the vagaries of FemLib), most of whom shed as much of their clothing as local custom makes even remotely possible. Some of the girls (women) can dance well, but there are few harsh critics of terpsichore in the audience at any given time. And even fewer subscribers to FemLib, come to think of it.

The next tent past the self-knotting fellow was a very large one, built square, and the smell permeated the midway. It was the elephant show, and three elephants were parading around just in front of it, each one using its trunk to hold the tail of the one ahead of it—taking up a lot of space and being overseen by a man in a sparkling red costume, with a long black whip and what looked like a large, very shiny slug gun.

Other people were pushing and shoving all along the midway—the Four Mile Circus (I have no idea where the name came from, and for all I know it's a traditional name for circuses—or, of course, carnivals) had been having a good season at Knessel. They were booked to stay for another week, before moving on to Arthur and then to six other towns on the continent—near almost all of which, I'd been told, Cecily Scriber had dependable spies.

What pushed and shoved its way past me just then was a small dog—of the poodle persuasion, I think, but I am not checked out as an expert on small pets. At any rate, the thing was no more than nine inches long, and four or five high, and it was covered with curly white hair, or fur, or some such damn stuff. It was yapping to beat all Hell, and it went right on yapping as its owner, a woman with iron-gray hair, a hatchet face and a grim set to her mouth and shoulders, gave a small *eek* of surprise and dismay.

The leash had somehow slipped out of her hand, and the dog had become a yapping, furry missile, targeted on the nearest leg of the nearest elephant.

The man in the sparkling red costume, of course, leaped to the defense of his massive great beast as the dog streaked forward, trailing its useless damn leash behind it. He cracked his whip—which accomplished nothing whatever. Even the sound wasn't audible, over the yapping of the dog, the first set of panicked shrieks from the crowd, and the sudden trumpeting of the elephants as the dog reached its tar-

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get zone, and sank its damn fangs into the target elephant's leg.

The elephant shook its leg, once, and the little dog went flying backward. It didn't hit the grim lady—quite—but whizzed right on by, its yap revised into a high-pitched and strangled yip, heading straight up, and over the tent of the dancing girls.

The dancing girls were no longer in evidence, being sensible people—but nobody had time to notice that. The technical term for what was happening was "Stampede."

I had no time to track the flying dog further: the stampede—one maddened elephant, and two companions anxious to help out, all of them trumpeting in weird hooting blasts—was heading straight for me, or as straight as made no difference. Around me people were flying into panic and fleeing in every direction. I waited about half a second, to pick a good angle to flee at, and headed across the midway. The dancing-girls' tent looked deserted, but I wasn't after company; I wanted shelter.

Not that the tent—which was some sort of brown canvas painted with wide pink stripes—would delay a stampeding elephant much more than three seconds, if that—but it was better than the open midway, and if I could get into it and past it I'd be invisible for a minute or so, and able to find my way to a safer spot, which, after all, had to exist *somewhere*.

The dancing girls apparently had much the same idea, and had departed the tent for fresh fields and pastures new, as the man says; I went through a litter of bangles, scraps of costume and a rickety-looking mechanical soundbox, still playing something vaguely Arabian, without stopping to take inventory. Then I heard the shots—four of them, spaced fairly quickly, and sounding very flat and small. A slug gun I wasn't familiar with, I told myself, and stopped running, and headed back through the litter to see if I could help pick up some of the pieces.

That was my mistake. That the damn big gun I'd seen the trainer holding was loaded with blanks, and was meant only to make a more-or-less convincing noise with which to command the elephants, hadn't occurred to me; I thought, naturally, that—now the beasts had gone nuts—he'd shot them dead. I was coming back more slowly than I'd gone out, but when the damn elephant came through the tent as if it had been gauze, and trumpeted at me, I turned yet again, and sped out the back as if the entire population of Hell had been after me.

The elephant moved faster than I'd thought a thing that size was at all likely to move. I nipped around a corner, turned again, found myself back on the midway, and angled toward the flea circus. There were more shots, and then more trumpeting—and then, slowly and raggedly, silence.

It seems (I got the bits and pieces of explanation much later) that the blanks had worked, slowly—and the sudden disappearance of available targets had worked even better. Humans had vanished from the vicinity, and the elephants, hearing the repeated gunshots, finally came to what I suppose passes for their senses, and stopped in mid-midway, so to speak, looking at one another, shrugging, and muttering the elephant equivalent of—Well, I just felt like a nice little run, you know? Good for the circulation. You too?

But explanation, as I say, came later. What came then was the silence, and a man who looked just a little like the fool dog that had started everything, who was sitting calmly in a caneback chair and staring at me.

After a second, I realized that the resemblance was mostly due to the white hair. I have seldom seen anyone so hairy: he was about five feet tall, and had enough white hair on his head, as beard and moustache, and down his bare arms (he was wearing a short-sleeved shirt and crazily old-fashioned black jeans) to stock a mattress factory. His eyes peered

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from under bushy white eyebrows, and they were a bright, cheerfully alert blue. He looked to be about eighty.

"Huh," he said, in a cracked baritone, a little hoarse with age. "Jerko actin' up again?"

"Jerko?"

"The animal," he said. "Called Jumbo, you know, but I say Jerko, myself. Supposed to be smart beasts, elephants. Never believed that much, you know. One small human trains 'em to do tricks; a *smart* elephant would learn the tricks, eat the human, and go into business on its own—ain't I right? By the way, who the Hell are you?"

I gave him my name, withholding comment on the intelligence of elephants.

"Maori Ruskin," he said. "Sole proprietor, Ruskin's Flea Circus. Nice to meet you. You were sayin', about Jerko?"

I hadn't been, but I began. "Some damn dog bit one of the elephants. Started a stampede. But they've calmed down now."

"Little white poodle dog?" he said.

I nodded.

"Knew that animal'd be trouble, first time I set an eye on the critter," he said. "Gal owns the thing comes by ever' few days, takes another gawk at the show. Some do that—mad on circuses, some people." He shook his head. "Dog sits down in the midway, yawns, scratches itself till Hell won't have it. Just sits while she goes explorin'. But one day, I said to m'self—one day, that critter'll mean trouble."

"You were right," I said.

He shook his head. "Stupid beasts," he said. "Elephants, stampedin'. I mean to say—start a thing, you oughta follow it through. Not stop right smack in the middle and go back to marchin' round with somebody's tail in your mouth." He sighed. "Anybody get hurt?"

"Don't know," I said. "I was a little too busy myself, getting out of the way."

He nodded. "Ayuh," he said. "Big, ain't they? Bigger when they're comin' at you. Just in from off-planet, are you?"

"Just landed last week," I said, assuming he'd caught a non-Pupil accent in my voice. "Heard about the circus, came on down to see it. Didn't expect quite so much excitement." Ruskin's clipped tone was getting to me; I fought it off. "It's an interesting show, what I saw of it—lots of new things. New to me, anyhow."

"New? Nothin' in the show under four hundred years old—bar the walkin'-trees, you know. Magic, fire, girls, elephants—been shows like that since Hector was a pup. Fire act near as popular as the girls, on Pupil; dunno why." He shook his head. "Fleas, too—not so many now, but there's still a few of us, you know. Train the little critters, care for 'em, show 'em off. Ever seen a performin' flea?"

"I never have," I said. "How in God's name do you train anything that small?"

"Professional secret," he said. "Truth of it is, Mr. Knave—I just write the instructions out real tiny. That's the trick, you know—gettin' the writin' tiny enough." He nodded at me. "That, and teachin' the critters to read, you know."

So—through a magnifier he provided—I watched some fleas march, and shoot off a miniature cannon, and form themselves into letters—an A, an O, a T. I had never seen anything like it, and it was damn near worth the trip to Pupil III to stare at the little things for a while.

But I had to tear myself away—and Ruskin was getting a little restive himself: the disaster done with, the midway was opening up again, and he wanted to be trolling for customers.

I saw a little more of the midway, and ambled on back to Gerhand's offices, which were in a small tent set behind the midway string, on my right. Gerhand was busy talking to a grim woman I had no trouble recognizing. And if I'd had any, the damn hairy dog she had in her arms—the thing looked undamaged,

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but torpid, and no wonder—would have reminded me.

As I came in he was saying: "Free animals. We do not allow it to be free animals on this lot. We have put at the entrances a sign—"

"Pookie wasn't free," she said. Her voice was much milder than her looks, a nice calm contralto. "Or loose, or unleashed. I know about your rule. I've seen your circus before, Mr. Vilkis. I had him on his leash, as I always do."

Gerhand nodded. "And the leash broke," he said. "Ms. Endicott, we are determined on our rules. The dog is small; to break, the leash must have been very thin. Ordinary care—"

"It didn't break, it slipped," she said. "I must have been holding it wrong—Pookie just tore it right out of my hand. I don't understand it; he's never done that before."

"Perhaps he reacts badly to elephants," Gerhand said. Then he noticed me, standing near the tent-flap door. "One moment only, Mr. Knave," he said. "I am discussing with Ms. Endicott the recent situation—"

"He's seen elephants before," the Endicott woman said. "He's seen these elephants before—we both like circuses, and Pookie and I have visited yours several times. It was simply an accident, and if you'll allow, we'll say no more about it."

"But I cannot allow," Gerhand said. "There has been damage. There has been fleeing in terror. This is not good for the Four Mile Circus. There will be repairs; there will be calming down of local citizens. Expenses will exist."

"It is not our fault," she said. "But if you insist on assessing damages, I'm sure we can arrive at a reasonable figure."

"Certainly," Gerhand said, smiling for the first time. "Mr. Knave, perhaps you will wait elsewhere for a short time, while we discuss."

"No, Knave," she said. "No, this won't take a minute. No need to disturb you at all. I'm sure whatever figure Mr. Vilkis names will be fair and equitable."

Gerhand's smile got bigger. He said something polite, and named a sum. The woman's eyebrows went up, and he reduced the sum by five per cent. She nodded.

"Payment by check will be satisfactory?" she said.

He nodded again, and the smile widened. A lot. "The damages will have been severe," he said.

"Write to me," she said. "I'm sure your figure will be acceptable; and Knave here is a witness to my statement. There will be no trouble—as long as dear Pookie is safe, and he is." She gave the white, hairy thing one fleeting look of adoration, looked back at Gerhand long enough to smile politely, and then turned the polite smile on me, upping it just a fraction. "We really must go now," she said. "It's been a terrible shock for Pookie, you know. That great beast was in a panic, of course—but Pookie might have been badly hurt." One more adoring look for the dog—duration about a fifth of a second—and a brief: "Goodbye, Mr. Vilkis. Goodbye, Knave"—and she was gone.

"It is not customarily such a simple thing, this business of damage," Gerhand said.

"No," I said. "Nothing like. But let's get down to our business."

We discussed possibilities for a while. Stealing electronic information is done in one of two ways: in situ or in transit. Either you go to the source and lift the data while it's sitting in spools or on disks or arranged in some kind of circuit—in situ—or you snatch at the stuff as it's beamed out—in transit.

In this case, stealing the stuff in situ didn't look possible. Most of it existed only in Gerhand's head until he sent it out by coded pulse to one of Cecily Scriber's tame spies; and while telepathy is a lovely notion, human beings don't have it.

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There exist telepathic races—no member of which was anywhere on Pupil III. It's possible for a human being to sneak onto a human world without being detected by Customs, police or the like. In fact, it happens every damn day, somewhere: businesses called Illegal Immigration and Smuggling are built on it. But a non-human has special needs, which are not all that simple to fulfill on a human world.

If the planet had had a diplomatic mission from one of the telepathic races, I'd have given the mission and its members some thought. Who knows which side of a human-versus-human fight any non-human person is going to pick to be on? As things stood, though . . .

The theft had to be made in transit.

"May God send it to damnation, Mr. Knave," Gerhand said. "It is a coded pulse. Such things are not simple to locate, or to learn of indetectably."

"All right," I said. "But there are methods—and any halfway competent data thief would know two. Or six. Assume he can find the beam, and tap it."

"It is not a powerful signal," Gerhand said. "The receptionist must be within a small range—half of a mile is good, but very much over that and the signal is lost. Closer is better." He shook his head. "And it is coded," he said. "If some person traps the signal, what has he for his troubles? He has a hash of things, Mr. Knave. He does not know the code. What use is a hash?"

I avoided making the joke; Gerhand was very truly worried. "Codes can be broken," I said. "There may be an unbreakable code—or cipher, they're not the same thing—somewhere, some day; people keep coming up with good tries. But there isn't one here and now—and Cecily Scriber certainly—"

"No names!" Gerhand said. "I beg of you, no names!"

"For God's sake," I said. "Nobody's going to recognize her name here—except the person who's stealing your data, and he already knows it. Or she does, what the Hell. Anyhow, whoever it is I'm not naming, she certainly hasn't come up with an unbreakable code all of a sudden."

Gerhand sighed. Windily. "Perhaps not," he said. "But whoever steals the data, he must be close by. Near. Within range."

"Half a mile," I said.

He shook his head. "Much less," he said. "He must select out the coded pulse from a mix of other beams, other noises—lights, directions, many varieties of communication. A carnival is very complex, Mr. Knave—he must select out. This must limit his range. The receptionist—"

"Receiver," I said, unable to resist a second time.

"The receiver, then—he has his equipment set to the right frequency, the right power, all. But the thief does not."

"Well," I said, "once our data thief *finds* the right frequency and so on—"

"It is changed for each new message," Gerhand said. "On a system I think he would have to ask me, or the receptionist, to provide. He cannot hunt each time from a distance of half of a mile; he must be closer." He stared at me. His eyes were small and black. "That is what gives me fright," he said.

"The thief's being closer?" I said.

"He must be on the lot," Gerhand said. "He must be part of the carnival."

It sounded plausible: somebody in the damn carnival was picking up Gerhand's broadcasts and passing them on to the Stern network, maybe by beam and maybe in any one of sixty other ways, including simply meeting a Stern operative (spy) and telling him (or her) the latest news. The trouble was, of course, that nobody in the carnival was a native of Pupil III. A motive for hooking up with Stern's people would have to have been the same motive that had hooked Gerhand up with Cecily Scriber, representing Minister Anthetor.

Money, God knows, is a common mo-

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tive—what the Hell, it was mine just then—but Gerhand wouldn't agree. "It is a closed society, this carnival," he said. "A person begins with us, he is with us every day and all day: he does not go home from his job, you understand. His home and his job are the same: they are here. We know each other, Mr. Knave, and we trust each other."

"All the same," I said, "wave a bundle of cash at somebody, and he may turn out to be pliable. It's been known to happen."

"True, all too true," he said. "But the money—how would he spend it? How would he account for it?"

It was a good question. The circus (carnival) wasn't all that heavily manned (or womanned, or, I suppose, personed); as the group traveled from Knessel to Arthur to whatever town was next, everybody would get to know a very great deal about everybody else. Somebody suddenly coming into strange new globs of money would get noticed fast.

But—"You're being paid yourself," I said. "Cecily Scriber is providing you with extra—"

"No names!" he cried, and went on, more quietly: "Again, true. But it is I who performs the bookkeeping for the Four Mile Circus. It is I who spends the money I receive—from a source we do not name—on repairs, on salaries, on the thousands and hundreds of demands of the Four Mile Circus."

"Right," I said.

"If I pay a little more, if I keep in better repair a tent or a platform—who will question or notice? But what is true for me, it is not true for any other person."

"So if he's getting money," I said, "or she is—it's not being spent. It's being saved up until the person leaves the circus—"

"Carnival."

"Carnival—for some other job. Or just being socked away as an old-age pension."

"It must be so," he said.

And so it had to be, apparently—but the notion was odd, and made the whole set of deductions seem a lot less probable. People being bribed to do something underhanded are not usually planning to sock the bribe away and let it sit in a mattress somewhere. Bribes tend to be right-now money.

But if Gerhand was right about the range requirement, it did look as if we had an oddity on our hands. And what the Hell, oddities do happen. Logic is a wonderful thing, but it can, after all, be overstrained.

So I wandered out, and watched some sideshow acts, and when the midway shut down for a couple of hours between shows I started talking to people.

I began with Maori Ruskin, of course, since I'd already met him. Naturally, I didn't simply walk into the tent and ask him about data theft—but a few casual queries about this and that established his innocence for all practical purposes. Ruskin had been with the circus (carnival) for fifty-three years—he'd signed on, originally, to Gerhand's father. If I couldn't turn up anything solid anywhere else, I'd go back and look at Ruskin again—I'd go back and look at everybody again—but he was a conditional No.

That was the trouble: everybody was conditional. Miniaturization being what it is, the materials for data theft could be hidden in a hollow tooth, and the materials for a tight-beam broadcast to some Stern sympathizer or other didn't have to take up much more in the way of visible space. You'd need an antenna of some sort, but a couple of inches of hair-thin wire would do.

And there didn't have to be a tight-beam broadcast, of course—the stuff, once stolen, could be passed on by any method the thief found handy.

So I left Ruskin, with a few kind words for his performing damn fleas, and went on to other candidates. There was no lack of candidates.

I talked with four of the dancing girls, I talked with the self-knotting fellow, I

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talked with the damn elephant handler and with the two translators assigned to the walking-trees—and I see no reason to bother you with any of a long, long day's (and evening's) worth of conversation. I talked to a Signor Flame, too, and a little of that may be worth reporting.

Signor Flame was a tall, black-browed man with graying, curly hair and the dark stare of a hypnotist. He was a fire-eater by trade—and, as I expressed interest in the trade, and as I was a guest of Gerhand Vilkis, who paid him every week, he was friendly and talkative.

"The thing to watch out for," he said, "is coryza. Coryza has killed more than a few of us, Mr. Knave."

Coryza is another name for the common cold—still rampant on Pupil III, as it is on six or seven planets where interesting viral mutations have taken place—just as Mr. Knave is another name for me. I generally tell people who call me Mr. Knave that I prefer Knave, but, since I was by way of being a spy this trip, or at least a consultant to spies, I let it go, and used Mr. Knave, more or less, as an alias.

But the common cold, however mutated and however much of a nuisance, doesn't kill people.

I said as much, and Signor Flame nodded. We were sitting in his living-tent, a warm, cluttered little place that didn't even seem to be fireproofed.

"The stopped-up nose, the itchy feeling, the slight fever—who cares?" he said, and waved a hand. Grandly: he did everything grandly. "But the cough—the cough, Mr. Knave, is a murderous enemy. When we begin to cough, we breathe in—quickly, sharply. It's a reflex."

"And if you happen to have your mouth full of flames at the time—"

"Exactly," he said. "I am very careful about all such things—coughs, sneezes, hiccups. We all are, we fire-eaters."

I nodded. "It wouldn't be the right trade for a person with a lot of allergies, for instance," I said.

"Allergies are controllable," he said. "I myself have several—to coconut fiber, for instance, and to some animal hair."

"Coconut fiber sounds easy enough to avoid," I said. "I don't even know if coconuts are grown on-planet—if there are any, they may be imported."

"Animals," Flame said darkly, "are everywhere." He gestured around the tent as if summoning up hordes of hairy things.

"Well, there are the elephants," I said. "And the fleas."

His laugh was a small bark. "With fleas I have no difficulty," he said. "And Girigu knows well enough to keep away from me, him and his immense beasts too. But cats and dogs—horses—you would not believe how many horses there are even in cities, on this pill of a planet, Mr. Knave—last week I canceled a performance."

"Because of a horse?" I said.

"A dog," he said. "A small hairy dog. I had never seen the beast before, but its owner—some awful woman—pressed up close to the bally platform for some reason. Luckily, this happened before I began my act at all. And what could I do? The dog was in her arms—an animal running free is forbid on this lot, of course—and I could not single her out and tell her to leave."

"So you canceled the show?"

"I made some excuse or other," he said, waving his arms. "I cannot even remember what. She was not there two hours later, when I began again; and I have not seen her since. But you can imagine."

"I certainly can," I said. And after a little more chat I got out of there.

It was all over but the thinking.

I knew who—and so, probably, do you by now. I'd had a strong hint earlier, and Signor Flame had just given me another one, and two hints were going to be enough—two hints, a slippery leash, and an attack of elephants. What I didn't know was how. And I had to know how:

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the idea wasn't to stop the data theft, but to detail it, and let it continue—continue stealing just the data Cecily Scriber and her busy little coterie of spies would put together for them.

So I went back to Gerhand's office tent and told him to make a phone call. Then I got busy rigging the tent.

Ms.. Endicott, trying to look friendly with a face too grim to allow of it, turned up about an hour later. "Now," she said, with no preliminary chat whatever, "what can the trouble be? I've been most fair with you. I have even left Pookie tied up outside—since animals seem to disturb you people so much. And—"

"It is only a matter of some details," Gerhand said smoothly. He gave her his best smile. "In assessing the damages which there will have been, Ms. Endicott—"

I quit listening. I was sitting quietly in a corner, looking at a copy of a circus (carnival) trade journal called *Bally Times*.

Stuck to the page I was reading with such attention was a readout. If the Endicott woman was electronically rigged—as I was sure she had to be—the readout would tell me. It had a very small range, but if the data thief was arguing with Gerhand right there in the tent, the readout would tell me. She'd have to be rigged every time she visited the circus (carnival), of course: Gerhand's transmissions didn't take place at set times.

Miniaturization is a wonderful thing. So is logic, but the wonders of logic began to escape me as I saw the readout, which was showing a nice clean Negative.

Damn it—fire-eaters were very popular on Pupil III. The damn woman had visited the Four Mile Circus over and over—and had turned up at the fire-eater's show exactly once.

And then there was Mr. Knave.

Lots of people call me Mr. Knave, as I've said, and the Four Mile Circus people all did.

But the Endicott woman had called me Knave. More than once. So she'd heard of me, somehow. And the obvious answer was: by stolen beam, when Cecily told Gerhand I was coming, or Gerhand acknowledged it.

And Signor Flame had provided me with a second oddity, and two were enough. When combined with the damn dog's attack on the elephants, when I happened to be nearby, they were more than enough. The leash had slipped, for the one and only time, and the dog had been goosed or trained or instructed to bite an elephant—with luck, I'd be trampled in the ensuing melee, and no one the wiser.

Except that my readout said that the woman wasn't rigged. She had to be, didn't she?

But she wasn't.

Gerhand looked over at me—casually; he wasn't bad at it—and I started to give him a very small and baffled negative sign—when the thing dawned on me.

And for one second I had it backward, not that it really mattered.

I gave him a different sort of sign, and left the tent quietly—Gerhand and Ms. Endicott (on my cue to Gerhand) were getting noisy about details of payment, somehow or other, and thus not noticing me—and saw the dog—Pookie, for God's sake—sitting quietly, tied by its leash to a tent-peg.

I petted the damn hairy thing—noticing that it wasn't a mechanical dog, damn it, which had been my first idea—if the woman wasn't rigged, then she owned a rigged (i.e., mechanical) dog. Was logic (or what passes for logic as it bounces around in my head) betraying me entirely?

Then I remembered Maori Ruskin, and I smiled, and I untied the dog. The animal wasn't mechanical, and rigging a small dog as a data thief is difficult, without leaving large traces. The whole operation can be mechanized, but strapping it onto the dog is all too showy, and gluing it onto the dog somehow or oth-

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er is no better: dogs with things stuck to them get irritable, and scratch even more than usual, probably damaging your rig.

Surgical insertion of components might have been possible, but wildly unlikely—we had a data thief here, and bringing in a spy (or another spy) who was also an accomplished veterinary surgeon seemed a little too desperate.

No, pass the woman, and pass the dog. Which left only one answer. The need for antennae bothered me for a second, but an inch-and-a-half antenna (retractable) offered no real problem: it was, after all, a very hairy dog.

When I got back to the tent the discussion was in full spate. Ms. Endicott was saying: "—certainly will not pay for a full new set of costumes for dancers, in addition to—"

Pookie wandered in, and yapped briefly. Ms. Endicott stopped, turned and gathered the beast into her arms.

"Now, did you break your leash, you poor thing?" she said. "Or did someone try, perhaps, to cause even more damage by untying—"

"We will not further discuss this," Gerhand said. He'd caught my signal: this time the readout had been positive. "You are right: the costumes will be my expense. But please, Ms. Endicott—let us make an end now. The dog is a disturbance—and once again unleashed—"

"Just so you understand—" she said, getting up. "I won't—"

"I am in complete understanding," Gerhand said, and the data thief—thieves—I suppose—went on out—mechanical, miniaturized, and riding on the dog.

Away back near the start of this, I mentioned that self-knotting fellow tuning his ukulele. As I said, it meant nothing to me at the time. But damn it, it *should* have meant something: it was a message from God, or Fate, or whatever name you have for such things. First of all, because "ukelele," in the Lost Language of the islands of Hawa(ii), means "flea." (No one knows what ever happened to Hawa(i), though there are some who identify it with another lost island, Atlantis.)

Second, because a ukelele tunes G C E A.

And musicians (and I've known a few musicians, here and there) have a little song that goes with those four notes. You've probably heard it—it's positively ancient, perhaps centuries preSpace.

Right.

My dog has fleas.■

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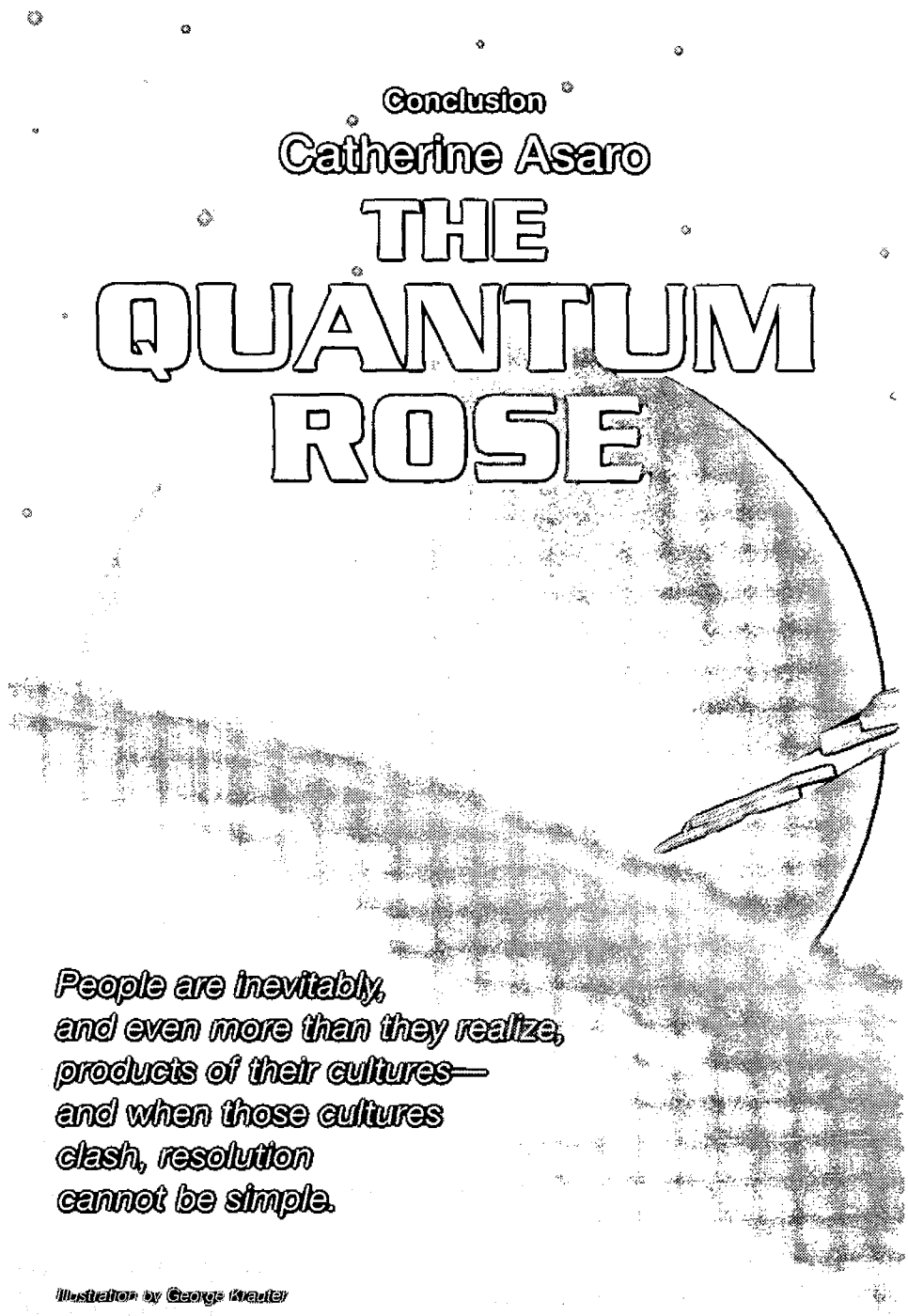
Conclusion

Catherine Asaro

THE QUANTUM ROSE



People are inevitably,
and even more than they realize,
products of their cultures—
and when those cultures
clash, resolution
cannot be simple.

Illustration by George Kiadis

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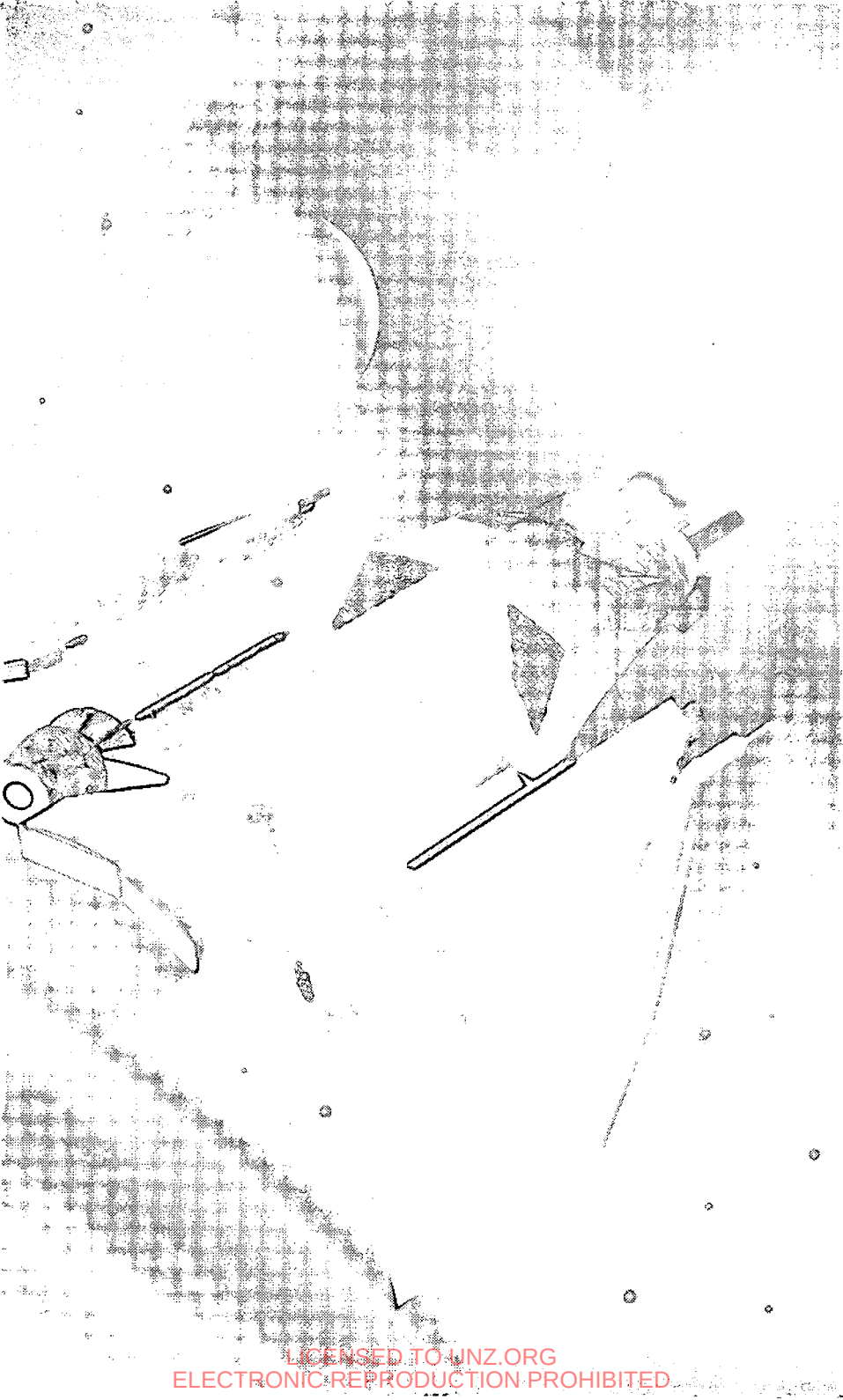

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Synopsis of Parts 1 and 2

***Kamoj Quanta Argali** lives on the planet Balumil, where the human population has lost all knowledge of its origins. Kamoj is the governor of Argali Province. Knowing her impoverished province is dying, she has established a merger with the province governed by **Jax Ironbridge**. Their agreement is both a business arrangement and a betrothal. Jax is an intelligent, strong leader, but he is also known for his violent rages.*

*Argali has a mysterious guest, **Havyrl Lionstar** (Vyrl), a brooding stranger. After seeing Kamoj swimming, a drunken Vyrl sends her a huge "dowry." In the laws of her people, he has made the equivalent of a hostile takeover bid in her negotiations with Ironbridge.*

*Forced into marriage with Vyrl, Kamoj learns he comes from offworld, but she doesn't understand what that means. She also discovers that beneath his troubled exterior, he is a gentle man with a deep sense of honor. Misunderstanding the customs of her people, he believes she came to him of her own free will. Kamoj also meets **Colonel Dazza Pacal**, Vyrl's doctor. Both Dazza and Vyrl are taller than Kamoj's people and speak an odd dialect of her language. Vyrl's people have also repaired the crumbling palace of Kamoj's ancestors, adding technological marvels that stun her.*

Vyrl and Kamoj respond to each other with strong affection. Due to their similar genetics, their brains have neurological properties that draw them together. Vyrl is a kind man and Kamoj is glad for their alliance. However, she fears the abrupt severance with Ironbridge will cause political repercussions.

During their wedding night, Vyrl wakes screaming from a nightmare. He lashes out at those who try to help him, then withdraws to drink alone. The next morning, a drunken Vyrl argues with Dazza. He wants her to alter his body so he can live on Balumil without a breathing mask. He ends the argument by taking Kamoj riding. In the forest, as he sobers up, he realizes he forced her into the marriage. He offers to set her free, but she tells him she wants to stay.

Vyrl opens up to her, revealing he is a citizen of the Skolian Imperialate, a collection of worlds governed by an assembly of councilors. He also descends from the Ruby Dynasty. His ancestors ruled the empire that founded the colony on Balumil. However, the fall of the empire left Balumil isolated for five millennia. The Skolians have finally relearned interstellar propulsion and are reclaiming the lost colonies. Although the Ruby Dynasty no longer rules, they have a great deal of influence.

Kamoj and Vyrl are interrupted by two Ironbridge soldiers. In the ensuing fight, Vyrl and one Ironbridge man are nearly killed. To Kamoj's shock, a huge "creature" lands, what she thinks is a giant metal bird. It is actually a shuttle from the Ascendant, the battle-cruiser that brought Vyrl to Balumil. The shuttle has been monitoring his position and actions.

The doctors take the injured men onboard and Kamoj goes with them. Her shock deepens when she see the "bird" is filled with bizarre surfaces and objects. It is, in fact, medical equipment. The doctors manage to save Vyrl and the Ironbridge man, but both are in serious condition.

As Vyrl recovers at the palace, he tells Kamoj why he is on Balumil. The Allied Worlds of Earth, who are also allies of Vyrl's people, provided protective custody for the Ruby Dynasty during a recent war. But after the war ended in a stalemate, the Allied Worlds kept Vyrl's family prisoners on the Ruby Dynasty homeworld, fearing to release them lest the violence start again. (The story of the Radiance War is told in the

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book The Radiant Seas, *which is the sequel to* Primary Inversion.*)*

After the war, Vyrl's father passed away. In honor of his purported dying wish, his coffin was launched into orbit around his homeworld by the Allied military. After one day the Skolian military was to pick it up. However, the coffin was actually a space craft, with Vyrl inside, a trick to free at least one member of his family. Unfortunately, an Allied bureaucrat stalled the pick-up—and Vyrl ended up spending a month in orbit. When his people finally recovered him, he was, in his own words to Kamoj, "stark, raving insane."

Now, a year later, Vyrl has recovered to some extent. But nightmares shatter his nights and he drinks to escape them. The Skolian military established their base on Balumil in the hope that its similarities to his own world would aid his recovery. As the love grows between he and Kamoj, she supports his attempts to stop drinking and he helps her heal from the emotional scars of her former relationship with Jax.

Vyrl also tells Kamoj that his people believe the humans on Balumil were breeding stock for slave traders five millennia ago. The battles between the traders and Ruby Dynasty caused the fall of the ancient empire and now drive the modern wars. The compatibility Vyrl and Kamoj feel comes about because they are both the human phenotype most sought by the traders.

The names of Kamoj's people define talents they were bred for; Sunsmiths have a gift for optical devices, Ampermen are good with electronics, and so on. Kamoj's name translates into "bound quantum resonance" and is an allegory for the metastable state created when one particle captures another in a scattering process. The intent was to produce humans less resistant to slavery. Jax's name is an acronym: Jks. It refers to a term in the wave expansion that describes a free particle. In other words, Jax descends from the free humans—the slave traders. However, Balumil's millennia of isolation have led to mixing of the traits in all the lines.

(The whole story is also an allegory for coupled-channel quantum scattering. Characters play the roles of interacting particles, with Kamoj, Vyrl, and Jax as the main players and other characters as secondary species. Colonel Pacal and General Hamilton represent mathematical terms that drive the scattering, and events play the role of physical process described by the math.)

Jax Ironbridge is infuriated by the loss of Argali and the woman he loves. In a carefully planned raid, he sets fire to Vyrl's holdings and the surrounding forests. During the chaos, his people kidnap Kamoj.

IX
IRON ROSE
Internal Bound States

In the drowsy contentment of first waking, Kamoj reached for Vyrl, her husband. She found only empty air. Opening her eyes, she looked up—at Jax Ironbridge.

Her serenity vanished. She was lying on Jax's bed, her arms free now. The tent was empty except for the two of them. It was also dark; the only light came from dimly glowing braziers. She had no idea how long she had slept. A heavy, slumbering night had fallen outside.

Jax was sitting on the edge of the bed, leaning his weight on one hand while he watched her. His hair hung around his face, straight and black, with streaks of grey. He wore a governor's clothes, rich and well-tailored: violet shirt, black suede pants, and black knee boots edged with silver fur. The silver-thread design of a bridge decorated the cuffs and collar of his shirt. Kamoj wondered

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which of his mistresses had embroidered it.

"How long have you been there?" she asked.

"A while." Leaning forward, he stroked her hair away from her eyes. "You looked so pretty sleeping. An Argali rose."

Argali. *Argali.* She jerked away from him. "You *burned* it."

His smile vanished. "Perhaps next time you will think before you humiliate Ironbridge."

She pulled herself into a sitting position. "How could you do it?"

Jax watched her with focused intensity. "If your former husband has any wits about him, he will evacuate the villages in time."

Former? "Lionstar and Argali have a merger."

A muscle in his cheek twitched. "It's being dissolved."

"You can't do that."

"Of course I can." He trailed his finger across her lips. "I have a gift for you."

The change in subject disoriented Kamoj. "What?"

"I had intended it as a wedding gift." He paused. "But I will give it to you tonight, even if we won't sign the contracts until tomorrow."

"Contracts?"

His voice hardened. "I learned a great deal from the *Ascendant* delegation that came to Ironbridge. This Drake Brockson, the man they call an anthropologist—he and I talked a long time. He has concerns about what he calls 'our native sovereignty.' Lionstar's actions here disturb him."

Although Kamoj knew the judges of her own people would side with Jax in this, she had expected disinterest from the *Ascendant*, perhaps even help. It hadn't occurred to her that Vyrl's behavior might have offended his own people as well as hers. At least they had been helping with the fires. Was Argali burning even now?

"Are the—" Kamoj stopped when she saw Jax's mouth tighten. She recognized the warning signs.

Jax stood up, the dim light casting shadows across his body as if he were a living statue. He had Vyrl's height and musculature, but the resemblance ended there. Where Vyrl was tawny, alive like the land in autumn, Jax evoked stone and iron.

A tanglebirch chest stood at the foot of the bed, carved with bridges and rivers. Jax went to it and took out a black lacquered box. "Ten years ago I traveled with some of my stagmen to the Thermali Coast, where the ships sail in." He came back and sat next to her again. "I got this from a merchant who sailed from another continent." Setting the box in her hands, he added, "I've kept it for you."

Kamoj almost flinched. Given the circumstances, how could she accept a gift from Jax? Painfully aware of him watching her, she lifted the lid. Inside, nestled in a bed of gold velvet, lay a porcelain egg, exquisitely designed, with silver filigree curling over it like lace.

She spoke awkwardly. "It's lovely. But I can't accept—"

He touched his finger to her lips. "Look inside."

Still she hesitated, but when irritation flashed across his face, she undid the latch on the egg. Gold velvet lined the interior, and jewelry sparkled within it, two earrings and a long necklace, all made in the Argali design, gold vines inlaid with ruby roses.

"Sweet saints," she murmured. "They're beautiful."

"Indeed." Jax picked up the earrings. Holding back her hair, he inserted the earrings himself, with an expertise that suggested a long practice of putting jewels on women. The rubies dangled against her neck, clinking together, their tiny bells making soft chimes.

He held up the chain next, letting its rubies glitter in the dim light. "Kamoj, you've truly a lovely stone as your namesake."

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She swallowed. "You are kind to offer me such a necklace. But I can't—"

"It's not for your neck." He laid his palm against her waist. "It goes here. Actually, with a waist as small as yours, it will rest on your hips. Women in Thermali wear them under their clothes. It's very pretty."

"Oh." She didn't want to know how he saw what women in Thermali wore under their clothes.

Jax set the egg and the box on the floor. He let the chain slide through his hand, until it pooled on the velvet spread in a shimmer of gold and rubies. Then he got up again and went back to the chest. This time he took out a braided cord made from glittering scale-hemp, with tassels on each end. Threads of beaten gold and bronze wove through the braid, and jeweled dust powdered its surface. It resembled the old farm belts she often wore, except instead of being functional, this was designed for beauty.

Jax stood by the chest, watching her with a shuttered look. "I had this made when you and I were betrothed."

Kamoj had no idea how to respond. Never in a decade of Long Years would she have imagined Jax indulging in the sentimentality of these beautiful gifts. "You are too generous."

"Am I?" He returned to the bed with slow, deliberate steps and sat next to her. Taking her hands in his, he wound the cord around her wrists. Then, with a jerk, he tightened the belt. "Am I, pretty rose?"

Kamoj flinched as the cord bit into the rope burns on her wrists. "Jax, don't."

"Why?" He twisted the belt tighter. "Is what I have for you not good enough now you've had his wealth to play with?"

"I didn't mean that." Her eyes watered from the pain. "What are you doing?"

"Giving presents to my love." His voice sounded clenched. "To the woman who humiliated me the moment a richer man made her a better offer."

"You *know* I had no choice."

"You had a choice. You could have said no." His lower eyelid twitched. "You think it was hard for you, being carried through my camp like an unwilling bondsgirl? How do you think it was for me, having you walk away, knowing you were going to another man's bed after I had waited almost your entire life for you?" Incredibly, his voice shook. "It happened so cursed *fast.* One moment I was looking forward to seeing you and the next you were gone."

She stared at him, stunned by the depth of his reaction. "I—I'm sorry."

"It doesn't matter. You're mine again." Gritting his teeth, he added, "Except he had you first."

"Jax, please—"

"Please, *what?*" Then he slapped her across the face.

"No!" Kamoj tried to lift her arms, to protect herself, but he held her wrists down with the cord. "Don't!"

"You want me to stop?" He hit her again. "How could you do it?"

"Jax, no!" Kamoj stuttered as he struck her a third time. "*Stop.* Please."

Reaching to his boot, he pulled a knife out of it. "Whether it happens again is up to you."

"What are you doing?" She tried to jerk away from him, but he held her in place by the belt around her wrists. With methodical strokes he sliced up the belt, shredding the gift until it was no more than a pile of raveled glittering threads.

Her voice caught. "Jax—"

"No." The blade glinted as he lifted it in front of her. Then he cut the shoulder straps of her dress. "I will hear no more."

Staring at the knife, Kamoj swallowed and remained silent. Jax laid her on the bed. His blade felt like ice as he cut away her dress. She stared at the tent overhead, at the cloth shaking with falling snow. A tassel hung from its highest

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point, bobbing back and forth. She focused on it, trying to numb her mind to the blowing snow of Jax's touch.

Some time later he fastened the gold chain with its ruby roses around her hips. His hair brushed her face, the scent of his astringent shampoo wafting in the air, mixed with the tang of his sweat. His clothes scratched her skin, the buckle of his loosened belt scraping back and forth on her thigh. She built a dome of ice in her mind, a place where she hid in numbing cold.

Later, he lay still. Eventually he rolled off her and sat on the edge of the bed, his booted feet planted on the ground, his elbows on his knees while he stared across the tent, lost in thought. Then he undressed and laid his clothes in a neat pile on the nightstand. Numbly, Kamoj wondered if he always undressed afterward instead of before, or if this was a game he played with her emotions.

When he saw her looking at him, he smiled. "Curious?" His voice had quieted, as if he had spent his rage with his passion. He pulled down the covers under Kamoj and slid into bed with her, then drew the soap-scented velvet over them both. She felt an absurd relief that the blankets were Argalian wool and the sheets spice-cotton, instead of exotic silks.

That was when she started to shake. Why, she didn't know. It was over. Done. Yet now her icy protective numbness cracked wide open and she shook like a vine during a storm.

"It's all right," Jax murmured absently, pulling her into his arms. After a while he added, "Perhaps Lionstar did me a favor."

"A favor?" Her voice sounded hollow.

"I got you two years earlier than I expected."

"Oh."

"What will he do now, do you think?"

"I don't know."

"Attack Ironbridge. Perhaps he will be killed." A chill edged his voice. "Imagine it, Kamoj. Your marauding lover from the stars stabbed through the way he stabbed my stagman."

She knew the *Ascendant* would never let Vyrl risk his life. But she couldn't rid her mind of the image: Vyrl in agony on the battlefield, bleeding to death.

Jax turned her over onto her side, with her back spooned against his front, a bitter parody of her wedding night. He drifted to sleep with his thumb hooked in the chain around her hips.

X
THE RIGHT OF INQUIRY
Three-Particle Scattering

"Something is wrong with her," Jax said. "She won't wake up!"

Another voice said, "She's tired, Governor Ironbridge."

Kamoj opened her eyes. Sunlight filtered through the sides of the tent. A rumpled Jax stood by the bed, looking as if he had thrown on the first clothes he found, a white shirt, black pants, and black boots. She recognized the stocky man with him: Elixson, an Ironbridge healer.

"When did she last eat?" Elixson asked.

"Yesterday morning?" Jax asked. "I don't know."

Elixson stared at him. "That's at least sixty hours. Probably longer, I would guess. She needs food."

Jax looked unconvinced. "I've gone longer without eating and not even noticed."

"She only has one stomach. She's needs sleep too. If you keep her up—"

"Your opinions are noted," Jax interrupted, his voice cold.

The healer flushed. "Yes, sir."

"You may go."

Elixson bowed to Jax, then headed for the entrance of the tent. But as he was lifting the flap, Jax said, "Healer."

Elixson turned back. "Yes, sir?"

"What should I feed her?"

Relief flickered over the healer's face.

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"Bland foods, for now. Bread. Tea. Anything more exotic and she could get sick."

"Very well," Jax said. "Go tell the cook."

After Elixson left, Jax sat on the bed next to Kamoj. When he saw her looking at him, undisguised relief poured across his face. He hadn't even fastened his shirt yet, leaving it open to the icy air. Had her inability to wake so rattled him? Whatever the reason, it relieved her that his mood had gentled.

"How do you feel?" he asked.

"Hungry," she admitted.

"When did you last eat?"

"The day before yesterday."

"When did you last brush your hair?"

Her hair? What was wrong with her hair? "I don't know."

"Rest as long as you need. The cook will send breakfast." He kissed her, then stood up next to the bed. "I'll be back this afternoon."

Kamoj fell asleep even before he put on his cloak. She woke when a bondsgirl left her a tray with food. She ate the grain, rolls, and soup, then went back to sleep.

Cramps woke her the next time. Curled under the covers, she held her stomach until the pain subsided. Then she slept again. When next she awoke, the light had dimmed, and the roof sagged, heavy with snow. The braziers had gone dark. The air on her cheeks felt cold, but under the covers she stayed warm.

She rolled over—to see Jax sleeping on top the covers. It wasn't his presence that surprised her: many people slept during early afternoon. But his cloak had fallen open and all he wore under it were his thin clothes. He still hadn't laced his shirt, leaving his chest exposed to the chill air. Did he even feel the cold? Such people existed, those almost unaffected by the killing climate. Vyrl claimed they had been bred for it, to better serve their owners. It suggested part of Jax's heritage came from slaves. No wonder Vyrl's people dreaded these *Traders* they fought, if Jax was a watered-down version of them.

He opened his eyes. For a moment he simply watched her. Then he sat up, rubbing his face. He got off the bed and went to the chest again, this time pulling out an armload of clothes.

Self-conscious, Kamoj sat up, holding the covers around her body. Jax came over and dropped the clothes on the mound of her body in the bed. The scent of spice-soap and new cloth wafted around her, fresh and clean.

"I need a bath," she said.

He nodded, then went to the tent entrance and spoke to someone outside.

Soon a bondsgirl appeared, carrying a vat of steaming water, towels and wash cloths, and a tray of soap. After the girl left, Kamoj looked at Jax, wishing he would go too.

"What's wrong?" he asked.

"Can you—" She stopped. Would he hit her if she asked him to leave? "I'm cold."

Jax touched her arm. "You've ice-bumps." He slopped a cloth in the steaming water, then wrung it out and pressed it against her face. Warmth spread its relief through her skin. But then Jax pulled away the blankets, letting in the chill of the air.

As Jax soaked the cloth again, Kamoj crossed her arms over her torso. "You don't have to wash me," she said.

"I know." He soaped up the cloth. "I like to."

He washed all of her, from her face to her feet, and dried her off with a towel. Then he chose a black silk scrap from the clothes, an underdress unlike anything she had ever worn, all bows and lace, its top a corset that pushed up her breasts and whittled her waist. He pulled the corset so tight she could barely breathe. Then he chose a velvet dress made from the same dark purple as his shirt and pulled it over her head. The dress covered her from neck to wrists to knees. Its flared skirt swirled around her

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legs, but the bodice fit so tightly she couldn't raise her arms. He finished with grey leggings made from Argali wool, then smoothed her hip chain into place over the wool and pulled down her skirt.

Leaning back on his hands, he surveyed his work. "You're beautiful, Kamoj. Ironbridge colors suit you."

She gritted her teeth. "Thank you."

He gave her knee-boots, purple suede-lined with silver fur. After she put them on, he pulled her up to her feet by the bed and drew her into an embrace, folding his cloak around her body. It came to just under her eyes, like a veil of dark Argalian wool. As always when his mood eased this way, she felt intense relief mixed with another emotion harder to define. It ached within her, so extreme it hurt. Hate? Or love? It felt far less pleasant than anything she had experienced with Vyrl. But no one had ever promised love would be pleasant.

A chime came from outside, a mallet hitting a small gong. Jax raised his voice. "What is it?"

His stagman stepped inside the tent. "The panel be here, sir."

Jax motioned Kamoj at the bed. "You can sit there."

Uneasy, Kamoj sat on the edge of the bed and folded her hands in her lap. The stagman let two people into the tent. The man she knew, an Ironbridge judge, one of Jax's advisors. The woman wore the robe of an Ironbridge priestess. Although the designs embroidered along its sleeves and hem resembled spindly hieroglyphs, the codices named them with different words. *Circuit diagrams.*

Jax, the judge, and the priestess all sat at a wooden table across the tent. Parchment crackled as the judge brought out his scrolls. The three of them were soon deep in a discussion. Kamoj felt dizzy from fatigue and lack of food, and barely able to breathe in the tight clothes, but she struggled to concentrate on their words.

They first considered the legal situation Jax faced. No precedent existed where a merger was so precipitately lost after so many years of investment. It was inconceivable—until it had happened. They intended to draft legislation to make sure it never happened again. As much as Kamoj agreed, in principle, that they needed laws to prevent someone from disrupting their lives as Vyrl had done, it made her own situation no easier.

The *Ascendant* was a complication. Apparently its minions believed their laws applied to her people. Yet neither Jax nor his advisors feared reprisals. In fact, they seemed to consider the *Ascendant* an ally, albeit a wary one. For some reason its legal people wanted to know if Kamoj had consented to sleep with Vyrl. As far as she was concerned, her marital bed was none of their business. What they should have been worrying about was the economic disaster Vyrl had precipitated in the Northern Lands by yanking Argali out of its merger with Ironbridge, all the while planning to leave her province and her people.

When Jax began to tap his riding quirt against his palm, Kamoj recognized the sign of his anger. Nor was it directed only against her and Vyrl. Jax had no grounds to censure Maxard for bowing to Lionstar, so instead he and his advisors spoke of other matters, making Maxard sound incompetent, unfit for any position of authority. They started on Lyode next, calling her morals into question, and spoke of taking her away from her husband so she couldn't have children. Kamoj understood Jax's message: unless she cooperated, those she loved would suffer.

When they moved onto Vyrl, she almost gagged. They planned to claim he raped her in a drunken fit. The *Ascendant*'s people had translated the contract scroll Vyrl had read at the wedding. It was indeed a merger contract, with gibberish about commercial licenses, zoning ordinances, business insurance, and property. Vyrl apparently could be

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held to its terms, which included provisions to negate a merger made through coercion.

Jax and his advisors all signed the document that annulled the Argali-Lionstar merger. When the judge said the *Ascendant* required Kamoj sign as well, Jax penned her name. Then they wrote down every term of the Argali-Ironbridge merger and signed that contract as well. Finally the judge rolled up the scrolls and put them in his valise. They all stood and talked a bit more, speculation about when the riders sent to Argali would return with news of the fires. Then Jax dismissed them.

When Kamoj and Jax were alone, he came over and smiled at her. "It is done, pretty rose. Ironbridge and Argali are merged."

Kamoj just looked at him. She had known all her life that someday this would happen, but she had never expected it this way, stripped of her power and freedom, with her province in flames. Had Jax deceived her all these years? Perhaps. But she suspected it would have been different had Vyrl never interfered. Did Vyrl and his people have any idea how much damage they had done? Did they care?

Jax rummaged in the chest and brought out a silver brush with rose-colored bristles. He sat next to her, more at ease now, as if penning his claim to her lands, heritage, authority, and self had eased him.

He showed her the brush. "When you and I were betrothed, Maxard gave me a small inheritance your mother asked you be gifted with on your wedding day. This was part of it." He rubbed a curl of her hair between his fingers. "Shall I brush it for you?"

She stared down at her hands in her lap. "All right."

He spent a long time with her hair, easing out the tangles with an ease she doubted came from taking care of his own hair. Then he brushed hers in long, slow strokes, from the crown of her head to her hips. Eventually he slid his arms around her waist and kissed her neck.

Outside, the gong chimed. Jax grumbled under his breath, then called, "What is it?"

"A rider came back from Argali," a voice answered. "He says it be urgent he speak with you."

"It had better be urgent," Jax muttered. He went to the entrance and pulled aside the flap. "Come in."

An Ironbridge stagman entered and bowed. "My apologies for disturbing you, Governor. But I thought you should know. They've doused the fires. Lionstar be riding up here now."

"The fires are out already?" Jax asked. "*All* of them?"

"Aye, sir. It be the metal birds. They spray a liquid that swallows flames."

"How did Lionstar find us? Tera hid the trail."

"He rides that wild greenglass. The spirit animal."

Kamoj blinked. Greypoint had fetched Vyrl? She had never heard of a greenglass doing such a thing.

"How many men does he have with him?" Jax asked.

"Seventeen stagmen. The rest ride to Ironbridge." He squinted at Jax. "A woman be with him too."

"Really?" Jax looked curious. "A bondsgirl?"

"I don't think so. An older woman. Grey and craggy. Not at all pretty."

Jax nodded. "You've done well. Get my mount and have sixty stagmen ready to ride."

After the man left, Jax turned to Kamoj. "So. He comes. Sooner than we expected but still too late."

"You're taking sixty men against seventeen?" she asked.

"Sixty stagmen and you." He spoke in a deceptively soft voice. "Make no mistake, Kamoj. You will let Havyrl Valdoria see that you are my dutiful and willing wife. If ever I believe you are even thinking otherwise, you will regret it." He

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shifted the quirt in his hand. "If you ever try to go back to him, I will do more than burn Argali. You will watch Maxard and Lyode die."

Kamoj wrapped her arms around her body. "I'll do what you want. Just don't hurt anyone."

"That is up to you." He took off his cloak and threw it on a chair, then went to another chest and took out his sword belt. She wondered what good he thought a sword would do against the *Ascendant*'s defenses. Not that it mattered. Jax had already defeated Vyrl using the *Ascendant*'s own laws.

Saints, but she wished she had spurned the Lionstar merger. Vyrl's people would never have let him attack Argali, even if such had occurred to him, which she doubted now. But how could she have known? Every one of his actions had sent a message in the ways of her people, carrying threats of violence and war.

Jax took her to the entrance of the tent. As he lifted the flap, Kamoj tensed. They both had on only flimsy clothes, and his shirt was still unlaced, open to the air.

"Don't you need your cloak?" she asked.

He pushed her forward. "It will just get in the way."

Outside, freezing air blasted them, and the sky pressed down like a lid of pewter. The camp was busy with people. At one fire, a bondsgirl poured a steaming drink for a stagman, her smile shy and her gaze averted as he closed his hands around hers on the mug. Her yellow hair suggested she came from one of Ironbridge's poorer districts.

Kamoj's parents had forbidden the Argali army to use bondservants, and Kamoj and Maxard maintained that ban. Although in theory both Jax and the governor of the North Sky Islands allowed it, only Ironbridge could actually afford them. The indenture usually lasted only a few years, but that didn't change the fundamental nature of the servitude. After what Vyrl had told her, Kamoj understood better where the practice originated and why it made her so uncomfortable. When left to their freedom and their starvation, the slaves had fallen back on the only ways they understood. They enslaved one another.

Across the clearing, a group of greenglass stags stamped their feet while stagmen tended them. By the time she and Jax reached the group, Kamoj was shaking from the cold, her breath coming in puffs of icy white condensation. A boy brought a huge stag forward, Jax's mount Mistrider. The animal shook his head, his antlers glinting like glass, his opaline scales ghostly in the mist. He stared down at Jax with green eyes slitted by vertical black pupils. Mistrider's wariness made Kamoj wonder how often he had felt his master's quirt through his supple hide of jeweled scales.

Using a stool called a stagmount, Jax swung onto Mistrider. The greenglass stamped and snorted, coming so close to Kamoj that she jumped back. When Jax motioned, she stepped up on the stool. Jax helped her up onto the stag, settling himself between the front and middle boneridges so Kamoj could straddle the animal in front of him. Mistrider picked up her tension, prancing beneath her, growing more and more agitated.

Suddenly the stag reared, his front and middle legs pawing the air, his bi-hooves clanging together like crashing symbols. With Mistrider all the way up on his powerful back legs, Kamoj and Jax were high above the ground, at the height of two tall men. Kamoj gasped and clutched the base of his scaled horns, the only "handles" available.

Holding her around the waist, Jax yanked her hands away from the antlers. "Never grab a stag that way!"

Mistrider came down, his bi-hooves pounding the frozen ground. Before Kamoj could catch her breath, the animal reared again, his head thrown back, his iridescent fangs barred. The stag

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screamed at the sky, a long, high cry that pierced the muted day. He crashed his hooves together again and again, until Kamoj feared they would shatter. Jax kept his arm tight around her, holding his reins with the same hand, his grip the only tether that kept her from flying off the animal.

With his free hand, Jax snapped his whip against Mistrider's flank. "Hai!" he shouted. "Be still!"

The stag came down and danced furiously to the side, invading the area around four other animals. They skitted away, stamping their feet and keening in quieter versions of the scream Mistrider had used to challenge the clouds.

The call of a flight-horn winged into the sky. Another horn answered, then a third. Moving together, the group headed into the forest, the animals falling into the intricate, complex rhythm of their six-legged trot. The riders took the traditional formation, half in front of Jax, half in back. Ever restless with tradition, Jax prodded Mistrider to the head of the company.

As they penetrated deeper into the woods, the noises of the camp faded. The mist suffocated sound, curling around the ancient trees. Drops of water clung to the needles. Scale dust glittered everywhere, in the air, in the mist, on the plants. Vines hung in great loops, draped over branches and twisted around trunks and fallen logs. Scaled ferns grew among the trees, their lacy heads nodding under the shifting weight of the bud-lizards that clung to the underside of their leaves, a motion all the more eerie because no wind disturbed the woods.

Kamoj saw the other riders before she heard them. She caught glimpses of stags and diskmail among the trees. Jax called out and the Ironbridge company halted, fanning out in a semi-circle several rows deep, with Jax at its center.

The Lionstar company emerged from the mist and stopped twenty paces away, greenglass stags mingled with prismatic scale-trees. Vyrl's two bodyguards flanked him, clad in black, from their boots to their heavy jackets. Both Jagernauts rode stags, huge animals big enough to support their bulk. They sat on their mounts with an ease that unsettled Kamoj, another indication of how Vyrl's people so easily bent her way of life to theirs. Dazza and Azander rode on either side of the bodyguards, and the rest of Vyrl's stagmen fanned out from them in a much smaller semicircle than the one formed by Jax's men.

Neither Vyrl nor his people wore breathing masks. Light sheathed their bodies instead, like the shimmer curtains. Vyrl's clothes were gray with soot and his hair fell in disordered curls to his shoulders.

Kamoj's vision blurred in a haze born of fatigue, hunger, exposure, and lack of breath. She clenched her teeth against the cold. Vyrl was watching her, his face strained as if he were struggling to hear a distant song in the trees. She tried to make her thoughts placid so he wouldn't feel them.

Azander spoke. "Lionstar acknowledges Ironbridge."

The stagman on Jax's right answered. "Ironbridge acknowledges Lionstar."

"Lionstar invokes the Right of Inquiry," Azander said.

Behind Kamoj, Jax's hair rustled as he nodded his agreement to the Inquiry. His arm tightened around her waist and he shifted the quirt until its tip rested on her thigh. She understood the warning.

"Proceed with the Inquiry," Jax's stagman said.

Vyrl spoke directly to her. "Kamoj, was it really your choice to go with Ironbridge?"

Her choice? Like ice water on her face, she realized how it must look: at the first chance, she returned to the people who had been at her side for most of her life.

"Do not presume to speak to my wife," Jax said.

"She isn't your wife," Vyrl said.

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"The papers were signed this afternoon," Jax said. "Your contract is annulled."

Vyrl stared at him. "You can't annul an Imperial contract."

"Perhaps you should read your own laws. A merger made through coercion is not legally binding."

"She wants to stay with me," Vyrl said. "She told me."

"You have witnesses to this?" Jax asked.

Vyrl looked at her. "Tell them."

Kamoj wanted to disappear. She tried to take a deep breath, but the boning of her underdress cut into her ribs.

"You have your answer," Jax said.

Anger sparked in Vyrl's voice. "That's because you have her too terrified to speak."

"If you came to this Inquiry to throw insults," Jax said, "I don't see much point in continuing."

Dazza spoke quietly. "Vyrl, perhaps we should—"

"I won't leave without her," Vyrl said.

"We can discuss this more privately."

"No.

"Vyrl—"

"I said no."

Dazza exhaled. "All right. Kamoj told me herself. Her marriage to you puts her in an almost impossible position. If she signed an annulment, then given her history with Ironbridge and the circumstances surrounding your merger with her, no Imperial court in its right mind will honor your claim to Argali."

He clenched Greypoint's reins. "I'm not 'claiming Argali,' damn it. I want my wife back."

"Legal won't see it that way," Dazza said.

"They'll do whatever I tell them."

Her voice cooled. "Yes, you could use your titles to take what you want. But you would be forcing the courts into breaking laws meant to protect cultures such as this from exactly this sort of mistreatment. I suggest you think long and hard about the consequences. Once it's done you can't reverse the damage. And believe me, Vyrl, the political fallout of abusing your position that way would be ugly."

Vyrl stared at her. "I'm not the one breaking laws." He turned back to Kamoj. "I know you don't want to stay with him. Tell them, Kamoj. *Tell them.*"

She could still hear Jax's words: *I will do more than burn Argali to the ground. You will watch Maxard and Lyode die.* She struggled to project feelings of contentment, but her mind kept replaying the nightmare of the previous night, the roughness of Jax's hands on her ribcage, or kneading her thighs the way a cat prepares a place to sleep, or clenched on her arms as he pinned them to the mattress.

"You *bastard!*" Vyrl's voice exploded at Jax, and Greypoint danced under him, on the verge of rearing.

Jax spoke mildly. "Is something wrong with you, Lionstar?"

Greypoint tried to move toward Kamoj, but one of Vyrl's bodyguards grabbed the reins, his hands a blur. Kamoj hadn't believed a person could move that fast. Vyrl swore at the man, and the guard's hand dropped to a tube hanging from his belt, one of the weapons that put people to sleep.

Kamoj saw several Ironbridge stagmen exchange glances. If Vyrl kept acting this way, Jax wouldn't need to discredit him. Vyrl would do it all by himself.

Dazza, however, was focused on him. "What did you think you picked up?"

Vyrl spoke tightly. "He comes from the same stock that produced the Traders. Think about it."

She glanced at the Jagernauts. "Did you get anything?"

The man said, "There's so much hostility between Prince Havyrl and Governor Ironbridge, it's swamped everything else."

The woman nodded. "Governor Argali is frightened. But I'm not sure who she fears, us or Ironbridge."

Jax spoke in a cool voice. "As

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strangers here, you may not realize the insult you give with this discussion." He stopped for a well-timed pause, then touched Kamoj's hair in a show of reassurance. "Of course this causes my wife concern, particularly given what she has recently endured."

Vyrl ignored him. "You don't have to stay with him, Kamoj. We'll protect you."

The way he had protected Argali? She kept her mind numb.

"Damn it," Vyrl said. "You aren't bound to him. You have free will."

"I want you to stop harassing my wife." Jax took a breath, like a man provoked past reason, yet struggling to remain calm. Then he used his soft voice, lowering it as if he spoke only for Kamoj, yet still loud enough for the others to hear. "I am sorry. But there seems only one way to resolve this. I must ask you to speak." He paused. "To the *Ascendant* woman."

That startled Kamoj. He wanted her to talk to Dazza? It made no sense.

The colonel spoke in a gentle voice. "Kamoj, did you sign the Ironbridge contract of your own free will?"

"I can't write," Kamoj said. "Jax signed it for me."

"That's not legally binding," Vyrl said.

"Did you understand the documents?" Dazza asked her.

"Yes," Kamoj said. The shorter she made her answers, the less chance she had of provoking Jax.

"Did you object to the signing?"

"No."

"Were you coerced?" Dazza asked. "Threatened? Did you at any time express the wish to return to Prince Havyrl?"

"No." Kamoj answered only the last question. Did they actually believe she would acknowledge being threatened in front of the person who had done it and sixty of his armed soldiers?

"She's too frightened to say anything," Vyrl said.

Jax spoke coldly. "Lionstar, if you persist in violating the procedures of this Inquiry, Ironbridge will withdraw."

Suddenly Kamoj understood why Jax wanted her to talk to Dazza. Although she knew the colonel outranked everyone, the others must see her as an enigma. Women with authority rode with bodyguards. If a woman formed a merger with an incorporated man, he usually offered the services of his honor guard as part of his dowry, but only after they were married. Nor was Dazza an Archer. By coming alone with Vyrl and his stagmen, Dazza put herself on the level of a bondsgirl. When Jax let her question Kamoj, he undermined Vyrl's authority by taking the Right of Inquiry away from him and giving it to someone perceived as having no authority at all.

"Kamoj can speak to whoever she wants," Vyrl said. "You don't own her."

"Of course I own her," Jax said. "The contracts are signed, and this time for a dowry beyond the ability of Argali to match."

As soon as Jax spoke, Kamoj knew he had finally made a mistake. It wasn't only Vyrl who reacted: Dazza and the Jagernauts also stiffened.

"This world is a member of the Skolian Imperialate," Vyrl said. "We may not have instituted formal assimilation procedures yet, but you are still under our umbrella. Slavery in any form is illegal according to our laws. If you signed a contract that makes Kamoj your property, you're in trouble."

Jax's hand clenched on his quirt. "You can't ride in here and demand we change customs thousands of years old because it suits your purposes. According to your own people, your laws require your government to work with ours to find resolutions to societal clashes without destroying our cultural sovereignty. Perhaps it has escaped your notice, Lionstar, but I am the government here." Malice touched his voice. "Besides, the moment you married Kamoj in one of our temples, according to our ceremonies, with that obscene dowry

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you sent her, you became her owner. It would appear you too are 'in trouble.'"

"She isn't anyone's property," Vyrl said.

Kamoj couldn't bear to listen any longer. She knew Jax. Beneath his control, his rage was growing. She was the one who would bear the brunt of it.

"Jax, I want to leave," she said.

His voice softened. "Of course." In a louder voice he said, "Ironbridge invokes a Close."

"I'm not leaving without Kamoj," Vyrl said.

Dazza spoke quietly. "If she doesn't want to go with you, do you really intend to force it?"

Vyrl stared at Kamoj. "We can protect you from him. Just say the word." His voice caught. "I can offer you the stars. All he can offer you is a lifetime of fear and pain."

Jax spoke evenly. "Answer him, Kamoj."

"I am the dutiful and willing wife of Ironbridge," she said. Was that enough? Would they leave her alone now? Did the people she loved have to *die* before they would listen?

"We can protect you," Vyrl said. "All you have to do is *ask*."

Kamoj felt Jax move the quirt. "I want to stay with my husband," she said. "Governor Ironbridge."

"No." Vyrl clenched Greypoint's reins. "*No*."

"She gave you your answer," Jax said. "What else did you expect? That being forced to spend a few days with a complete stranger, a man whose only interest was in assaulting her, would supersede a lifetime of dedicated companionship?"

"She never wanted to marry you," Vyrl said.

"Are you stupid?" Jax asked. "She told you what you wanted to hear. It is you that she fears, Lionstar."

Vyrl watched Kamoj. "Is that true?"

Jax stroked her hair as if to comfort her. "It's all right. Answer him. Then we can go home."

"Yes," she lied. "It's true."

Vyrl stared at her. Then his expression closed on itself. Quietly he said, "Good-bye, Kamoj."

Good-bye. The word echoed in her mind. Good-bye.

Vyrl motioned and his party reformed around him. When he pulled on Greypoint's reins, the stag danced toward Kamoj. It shook its head, once, twice, three times. She recognized the pattern. Many a greenglass went through that same dance with his young, herding them to where he thought it best they go.

Vyrl rubbed Greypoint's shoulders and pulled the reins. The stag kept trying to dance toward Kamoj. The third time Vyrl pulled, Greypoint relented and turned with the rest of the company, heading into the woods.

Good-bye. He was going. Forever. As Greypoint receded into the mist, dismay broke through Kamoj's deadened thoughts.

Behind her, Jax's muscles relaxed. He leaned his forehead against the back of her head and whispered, "It's over, pretty rose. We can go home now. Finally." Then he straightened up and pulled on Mistrider's reins, bringing the stag around.

Kamoj swallowed. Home. It was done. She and Vyrl had bounced off each other and hurtled away.

That was when she snapped. She had no idea if it was her first true act of free will or a mental breakdown born of her depleted condition. She only knew that she broke inside. Leaning to the side, she strained to see around Jax. Her body protested every move: bile rose in her throat, pinpricks danced on her skin, pain thrummed in her head.

Then she shouted, "*Vyrl! Don't go!*"

XI
THE BURROW
Resonance Lifetime

Jax swore and yanked her back in front of him. A roaring filled her head,

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produced by her act of rebellion. Spurred by Jax's quirt, Mistrider ran through the trees like fog blown by the wind. Jax called to Lector and the stagman pulled alongside, their mounts running side by side.

"Take her to the burrow," Jax said. He passed Kamoj over to Lector's stag without even slowing down. Seated in front of Lector, Kamoj felt numb. Jax wheeled Mistrider around and took off, disappearing into the mist and the darkening night.

Lector rode hard through the trees. When Kamoj shivered, he pulled his cloak forward, around her. What had possessed her to call Vyrl? He had seventeen stagmen and Jax had sixty, plus forty more in camp. Ironbridge would slaughter Lionstar. Then again, Vyrl's people had their *Ascendant* weapons. They might slaughter Ironbridge. Either way, people would die.

When the fading light turned the mist a darkling pearl color, Lector slowed his stag, letting it find its own way. Finally he stopped. As he jumped down, his cloak swirled away and icy air clapped around Kamoj.

He eased her off the greenglass, sliding her down to the ground. "We cannee ride any longer. It be too dark."

She tried to nod, but the day's drizzle had turned to snow and she was shaking too hard. Watching her, Lector removed his cloak and gave it to her. As she wrapped it around her body, he tapped his stag with a signal to wait. The greenglass stamped its feet and bared its teeth, its breath curling out of its nostrils, heavy with a spiced musk odor, adding condensation to the fog.

Lector led her forward into the darkness. The scents of the wet forest permeated the air, eddying and flowing around them. Even after Kamoj contracted the membranes in her nose, she was swimming in a sea of smells.

She pulled the cloak tighter. "We need shelter."

Lector leaned down. "Eh?"

"Shelter." Her teeth clattered together from the cold. "We need shelter."

"Aye." He guided her around an upended tree with moss hanging from its roots. They approached the looming shadow of a hillside, closer and closer, until its darkness folded around them. When Kamoj reached out her arms, her hands brushed over dirt walls laced with roots.

"You best wait here," Lector said.

She stopped, listening to the tread of his boots. A spark jumped in the air about ten paces away. Then a sphere of light appeared, with Lector at its center holding a lamp. They were in a burrow with earthen walls held together by networked roots. The wavering light threw shadows on the walls, revealing bags of food in one corner, along with a blanket.

"It inna so bad, heh?" he asked.

"Lector, let me go," she said.

"I cannee do that, Gov'nor Argali."

"What if I just left?"

"I would have to stop you, ma'am. I'm sorry. I be liege to Ironbridge. I cannee fail him."

Kamoj hadn't really expected otherwise. She doubted she could have survived in the forest anyway, on this freezing night, dressed as she was, having eaten only one meal in over two days.

Lector set the lamp on a ledge formed by a tree root. Then he took the blanket from the corner and spread it on the ground. "For you, Gov'nor."

"Thank you." She sank down onto the blanket, grateful for the solidity of the ground. "Are you cold?"

He settled himself on a large boulder near the entrance. "Heh?"

"Cold." She offered him the cloak. "Aren't you cold?"

"Please keep it, ma'am. Cold never much bothered me."

Like Jax. Unlike Jax, however, Lector seemed to notice when it bothered others. Grateful for a bulwark against the chill, she wrapped the cloak around herself again.

Lector stretched out his legs and

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leaned against the wall. "I can tell you what makes ice on my spine. The magics in these woods. You be better off without Lionstar. That demon prince would trap your soul."

"I don't think it's magic, Lector. It just looks that way. And Lionstar is no demon."

"Heh?" Lector leaned forward. "Who is the demon?"

Her voice caught. "Me. I caused these problems."

"Why do you say that? You hanna done nothing." His voice gentled. "This madness will end. You will see."

She swallowed. "It's kind of you to say that."

"I've a daughter your age. When I look at you—" He shook his head. "It be a father's nightmare."

The sound of dirt skittering across leaves came through the entrance, followed by the tread of boots. Lector stood up and drew his sword.

"Step and call," a woman said.

"Come," Lector said. Sheathing his sword, he stepped aside to let Tera and a stagman enter, followed by a taller man. Jax.

The Ironbridge governor glanced around, his gaze scraping past Kamoj as she got to her feet. To Lector he said, "Did you have any trouble?"

"None at all, sir."

"Good." Jax sat on a boulder. The soldiers sat then, too, Lector on the other boulder and the others on the ground. With five people crowded into the burrow, Kamoj stayed on her feet, pressed against the earthen wall.

Jax regarded Lector. "I need your counsel."

The stagman sat up a straighter. "It be my honor."

"I must decide a course of action," Jax said. "Everything has changed now."

"What happened, sir?" Lector asked.

"Lionstar insisted I let him speak to Governor Argali." Jax made an incredulous noise. "Seventeen stagmen and one old hag, and he threatens me. When I gave the order to my archers to fire, it was like ordering the slaughter of bihoxen."

Kamoj dug her fingers into the wall. The question *Is he dead?* hung in the air like a mist-o'-mime.

"What did they do?" Lector asked.

Jax leaned forward. "One of Lionstar's bodyguards drew his weapon so fast it made a blur. An essence came out of its end. It made orange sparks in the air. The tree he pointed it at exploded in a burst of orange light. Lionstar's other bodyguard swept her weapon through an arc and more trees exploded." He grimaced. "As fast as an archer can knock a ball, his bodyguards could have killed my entire company."

"It be sorcery," Lector said. "I feel it in these woods."

"It just looks like sorcery." Jax considered Lector, then the others. "Do any of you read?"

Hai! Kamoj wanted to shake him. How could he talk about reading now? Was Vyrl alive or dead?

"I can read and write my name," Lector said. "My wife's name too, and those of our children. I know a few other words."

The other stagman spread his hands. "I cannee read at all."

"I be knowing my name," Tera said.

Jax looked disappointed, but unsurprised. Kamoj wondered what it was like for a man with his intellect to live in a place where almost none of the population could even read, let alone offer him an educated discussion.

"A codex in my library describes weapons similar to Lionstar's," Jax said. "They rely on something called 'particle physics.' The source of the orange light is a sub-electronic particle called an abiton, the antiparticle of a biton. It has a rest energy of 1.9 eV and a charge of 5.95 raised to the negative 25th power. Whatever that means. And this charge is called *Coulomb.* It's the same as the name in the Amperman line, I'm sure of it. The gun uses a mag-

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net of 0.0001 Tesla and its accelerator needs a radius of five centimeters." He held up his hand, his thumb and forefinger a short distance apart. "This is a centimeter."

The others remained silent, watching him as if his words were an incantation.

"If his people have these weapons," Jax said, "they may well have other devices described in the old codices."

"It be a bad omen," Lector said.

"Is it? Or the promise of the future?" Jax rubbed his chin. "Then there is Lionstar's language. He speaks pure classical Iotic."

"You mean Iotaca?" Lector asked.

Who cares what they speak? Kamoj thought. Tell us what happened.

"That's right," Jax said. "The temple language."

"But no one understands it any more," Lector said.

Jax shrugged. "That's only because the ancient glyphs are different from the ones we use now. And the temple priestess has a different accent than Lionstar. I have trouble understanding the priestess, but Lionstar is easy."

"I cannee understand him at all," Lector said.

"Your dialect is more removed from Iotic," Jax answered. "Classical Iotic was the language of the highborn here, in the days before the Current died. Lionstar probably inherited it the same way I did, as a nobleman descended from an ancient line." He paused. "But I don't think it's the native tongue of his people. Petrin told me that on the *Ascendant*, the crew spoke a language he didn't understand."

Petrin? It took Kamoj a moment to figure out he meant the Ironbridge stagman Vyrl had stabbed, the man the metal bird had taken to the *Ascendant*.

"Yet they all speak Iotaca to Lionstar," Lector said.

"They are his lieges," Jax pointed out.

"He does seem to have authority," Lector acknowledged.

Kamoj began to relax. If Vyrl had died, surely Jax would have said something by now.

"It's more than his authority," Jax said. "He's *valuable* to them, beyond being their prince. His people would kill every one of us to protect him, if it became necessary. And how do they move so fast? What do they have inside their bodies that lets them do that?"

"It be a bad affair," Lector said. "Like that old sorceress who rides with him."

"They don't use sorcery," Jax said. "Just knowledge we've forgotten." Longing showed on his face. "What must their armies be like? It stretches the mind to imagine it."

"I cannee imagine it, sir."

Jax exhaled. "We had better try. We have to know what we're fighting." He glanced at Kamoj. Although she averted her gaze, it wasn't before she saw his pain, the vulnerability toward her that he hid almost as soon as it escaped his defenses.

"None of Lionstar's party were close enough to decipher my wife's outburst," Jax said. When she looked up, he was talking to Lector again. "But it has spurred the *Ascendant*'s people to investigate. They are bringing an 'Arbiter' tomorrow to resume the Inquiry. If we don't cooperate, they threaten to use force."

"If they be so powerful, why do they hesitate with this 'force'?" Lector asked.

"They don't want to exacerbate the situation," Jax answered. "Apparently I'm one of the leaders they expect to deal with when they institute 'formal assimilation procedures' here."

"I donnee understand that," Lector said.

Dryly Jax said, "Nor do I." He fell silent and the stagmen waited. Finally Jax said, "Well, Lector, what do you think?"

"Sir?"

"Give me your opinion on the situation."

"You must never give in to Lionstar. It would weaken your authority."

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"My thought also." Jax blew out a gust of air. "But by the Current, man, how do I maintain authority here?"

"I donnee know, sir. But you must."

Disappointment flickered across Jax's face, but he seemed unsurprised. Although he glanced at the others, he didn't seek their counsel. It didn't surprise Kamoj. What could they say? He was so far beyond them in intellect and education that his asking for their advice was like Vyrl asking her how to sail a sky boat.

Finally he said, "My wife and I will remain here tonight, in case Lionstar violates the truce his people set up and tries to find her. I will need the three of you on watch outside."

"It be our honor," Lector said.

Jax nodded, then dismissed them. After the soldiers left, the governor continued to sit on the boulder, staring at the ground. Finally he looked at Kamoj. "Come here."

She walked over to him. Even wrapped in Argalian wool she was still shivering.

"Why are you wearing Lector's cloak?" he asked.

"I was cold. He gave it to me."

"Delicate Kamoj." Bitterness edged his voice. "Pretty delicate rose. I truly am a fool, because I still want you."

"Jax—"

"No." He shook his head, denying whatever remained unspoken on her lips. "Tomorrow you will be asked to sign the merger and annulment contracts before witnesses, with an X since you can't write your name." He regarded her with a steady gaze. "You will do this, Kamoj. I will tolerate no more betrayals."

She swallowed, afraid to voice her question yet needing the answer anyway. "And if I refuse?"

Softly he said, "Then I will kill you, Kamoj. I will see you dead before I let these conquerors take what belongs to me."

* * *

XI
CONSENT
Multi-Channel Scattering

A voice pulled Kamoj awake. For the past few hours, she and Jax had been sitting against a wall of the burrow, dozing. She couldn't truly sleep, though. Hunger and thirst gnawed at her. Just the act of breathing had become a torment, a battle against the constriction of her clothes. The cold felt as if it had permeated to her bones.

Jax also slept fitfully. He had neither cloak nor jacket, and he still hadn't bothered to lace his shirt. Frost lined the hairs on his chest. His quirt, sword, and leather sword-belt lay at his feet.

"Governor Ironbridge," the voice repeated. A stagman stood within the shadows by the burrow entrance.

Jax stirred, then sat forward, rubbing his eyes. "Lector? Come here, man. What is it?"

Lector came over and knelt by him. "You had the right of it, sir. Lionstar attacked the camp. There was fighting."

"I don't suppose Lionstar is dead by any chance?" Jax asked.

"No, sir. No one died."

Jax rubbed his neck and shoulders. "What is the situation?"

"We did as you said and made use of the spelled box the *Ascendant*'s minions gave you."

"Did anyone answer?"

"Indeed," Lector said. "The *Ascendant* sent a metal bird. It took away Lionstar and left ten of those large *Ascendant* stagman who wear black. They be at the camp now."

"Ten?" Jax tensed. "As conquerors or protectors?"

"We donnee know. They say nothing."

"I want you to send a message to the *Ascendant*," Jax said. "Tell them I've changed my mind about this Arbiter of theirs, that I'm willing to go with their first choice after all."

"Sir?"

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"They chose a woman. I refused." Jax pushed back his hair. "This is the message: 'His honor, the Governor of Ironbridge, accepts the *Ascendant*'s first choice of Arbiter. Although he has discomfort with this, as women don't serve as judges here, his wife would feel more comfortable talking to a woman.'"

Kamoj stiffened. She had never said that. She had no desire to talk to anyone. She just wanted this to be over.

After Lector left, Jax turned to Kamoj and drew her into his arms, pulling Lector's cloak around them both. He spoke against her hair. "You are so warm under here."

She wondered how his body worked, that he thought her warm when she felt so cold. If only he had a kindness to match his physical strengths and prodigious intellect.

"This is why he attacked my camp," Jax said. "He knows I'm alone with you." His voice sounded strained. "How does he do it, Kamoj? How can he see what is in your heart so much better than I?"

"He feels emotions," she said.

"His bodyguards do also, don't they? To a lesser extent."

"I think so."

Bitterness touched his voice. "Shall we give him more emotions to feel, ones he can get from you tomorrow at the Inquiry?" His hand moved over her breast. "The feelings of a man and his wife together?"

"Jax—"

"'Jax,' *what?*" His voice hardened. "A lifetime we've built together. Then in one day you throw it all to a stranger who invades our land, steals our loved ones, mocks our ways, and plunders our dreams." He gritted his teeth. "You pushed me too far tonight, calling for him. I can't just let it pass."

As he reached for his belt, Kamoj tried to shield herself with her hands. Her tight sleeves stopped her from lifting her arms, but soon it didn't matter. Jax wanted no cloth protecting his target. He showed her the ways of his quirt and belt, their every texture and nuance, then held her in his arms and showed her the ways of himself, giving her memories meant to torment Vyrl as much as please himself.

Later, when he had fallen asleep, she tried to blank her mind. To forget.

The Ironbridge camp took form out of the morning's misty light. Stagmen were everywhere: Ironbridge in violet and silver, Lionstar in copper and blue, *Ascendant* in black.

Kamoj rode on Mistrider in front of Jax, flanked by Lector and Tera on stagback. She could imagine the sight they made, emerging out of the prismatic mist, otherworldly and antediluvian on their shimmering greenglass mounts. With such a small party, they would appear vulnerable to Vyrl's people, helpless natives come to face a rampaging sky-boat prince. She wondered if Jax had planned it that way.

She felt dazed. In the last three days she had eaten once and slept only a few hours. The chill penetrated her bones. Jax had given his word: she could eat and sleep after the *Ascendant* people left. She didn't doubt he meant it; one reason he inspired loyalty from his people, even if they also feared him, was because he kept his word.

Twelve soldiers waited outside Jax's pavilion, four each for Ironbridge, Lionstar, and the *Ascendant.* As Jax and his party rode up to the tent, three boys appeared, running up to meet them, staghands in breeches and heavy furs. After Jax and Kamoj dismounted, the youths led away the greenglass stags. The Ironbridge and Lionstar stagmen bowed while the *Ascendant* soldiers watched Kamoj with a disturbing intensity. Were they trying to read her emotions? *I am a lake,* she thought. *A flat lake. No ripples.*

An Ironbridge stagman spoke. "The Inquiry awaits inside."

Jax nodded. Kamoj wondered how he

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had arranged to have Vyrl wait for him. A morass of conflicting authorities surrounded them here, complex and intricate.

Flanked by stagmen, they entered the pavilion. Braziers warmed the tent, and the sudden increase in temperature made Kamoj queasy. The Inquiry waited at the table where Jax had signed the contracts yesterday. His priestess and judge were already there, along with two strangers, a man with black hair and an older woman. Shimmers covered the strangers and they dressed like Dazza, in grey bodysuits with the exploding sun insignia on one shoulder. They and Kamoj were the only ones with no weapons: all the stagmen carried swords, and the *Ascendant* soldiers had snouted weapons on their belts.

Everyone at the table stood up as Jax entered. He ignored them, glancing around the tent. Vyrl was nowhere to be seen.

A rustle came from behind them. Turning, Kamoj saw eight soldiers entering the tent, four from the *Ascendant* and four in Lionstar colors.

A man with iron-grey hair walked among them.

He towered over the stagmen, massive in build, with a face of granite-hewn lines. He too wore the grey uniform, but his had gold ribbing on the sleeves. His presence riveted attention. Kamoj needed no introduction to tell her this man carried authority. The force of his personality filled the tent.

Next came Vyrl, with two bodyguards, huge men in Jagernaut black who seemed to be holding him prisoner as much as protecting him. Seeing him, her heart raced. Neither he nor Jax spoke: instead, they stared at each other, their hostility almost thick enough to see.

Vyrl had no weapons, or ceremonial clothes and diskmail. In fact, she had never seen garb such as he wore: grey trousers with a crease down each leg and cuff at the bottom; a white sweater with a high, folded neck; and shoes with no visible seams. The fabric of his pants was so fine she couldn't see the weave. She knew of no one who could sew such a flawless garment.

At the table, the woman from the *Ascendant* spoke. "It would be best if the weapons remained outside the tent."

There was a shifting of weight, feet moving, hands sliding on hilts, the crackling of brazier. Kamoj waited for Jax to refuse. If he or his stagmen gave up their weapons, Ironbridge relinquished what share of authority it had so far managed to retain.

Incredibly, Jax removed his sword belt and handed it to one of his stagman, then nodded for his soldiers to remove theirs. After an awkward silence, Vyrl told his people to disarm. The man of power from the *Ascendant* watched the exchange with an intent gaze that Kamoj suspected missed nothing. When he glanced at the two men guarding Vyrl, the Jagernauts, they gave slight nods, acknowledging whatever unspoken order he had just made. When the other twelve soldiers left the tent, the two Jagernauts remained behind.

Jax considered them, and the bulky black weapons on their belts, the "antimatter guns." Then he looked at the *Ascendant*'s people, his accusation obvious without his uttering a word.

The woman spoke. "Given the conditions of Prince Havyrl's arrest, his guards cannot remove their guns while they are standing guard on him."

At the word "arrest," satisfaction flickered on Jax's face. He made no further dispute. It surprised Kamoj, given his intent to establish authority. That was done with behaviors that displayed the expectation of obedience. But then, such methods would do little good here, given the superiority of the *Ascendant*'s people in everything from weapons to physical size to clothing. This battle would be fought in more subtle ways.

Besides, Jax was still armed. He had shown her the knife this morning as he

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hid it in his boot. It didn't matter that one knife was nothing against "antimatter guns." If he stabbed her with it, she would still be dead.

Everyone stood, waiting. Then Vyrl sat down, across the table from Kamoj. She eased into her chair, trying to hide how much it hurt to move or sit. The man of power from the *Ascendant* sat next, followed by everyone else. A rustle came from the tent entrance and the twelve soldiers reentered, all unarmed now.

A new person came with the soldiers. Dazza Pacal. As she sat at the table, the Ironbridge judge frowned and glanced at Jax. Yet again, Jax made no protest. Instead he nodded to the colonel as if it were perfectly natural for her to attend an inquiry that concerned his personal life and had nothing to do with her. Of all people, he was the last Kamoj would have expected to show such flexibility.

The unfamiliar *Ascendant* woman spoke. "I am Major Tulain." She nodded to the man of power. "General Hamilton Ashman."

Kamoj froze. Ashman. *Ashman.* Vyrl had told her that name. General Ashman commanded the *Ascendant*. This was the man who had made the decision to leave Vyrl buried alive above the sky.

"I will serve as Arbiter for these proceedings," Major Tulain continued. "Is this acceptable to all parties?"

Jax spoke quietly. "Ironbridge accepts."

"Yes," Vyrl said.

The Arbiter waited. When the silence became awkward, she said, "Governor Argali?"

Kamoj tensed. Now what?

"Major Tulain." Jax paused. "A woman in Kamoj's position, that is, in a merger such as ours, won't speak at a proceeding such as this."

"Unless he gives her permission." Vyrl's voice grated. "As her owner."

Jax tried to look patient. Tulain glanced at Vyrl, then back at Jax. "Is that true?"

"Prince Havyrl chooses to see our lives through the filter of his experiences," Jax said. "Although this is understandable, given his condition, it makes no sense to confuse our customs with those of the people you are at war with, a people we have neither met nor had any connection to at all."

"Confuse hell," Vyrl said.

Tulain gave him a warning glance. Then she spoke to Jax. "Your willingness to adapt to our procedures for the benefit of Governor Argali has been noted and appreciated. However, we can't proceed with this hearing unless she participates."

Kamoj waited for Jax to refuse. Instead he turned to her and spoke softly. "Please. Feel free to speak."

She gritted her teeth. He made himself look so reasonable, a leader trying to do the best for his wife and people. In his own way, that *was* his intent. But, if she said something he didn't like, she would pay for it later.

"I want Governor Ironbridge to speak for me," she said.

"I object," Vyrl said.

"She has the right to make the request," Tulain said.

"What's wrong with all of you?" Vyrl said. "Can't you see she's afraid of him?"

"Perhaps it isn't me that she fears," Jax said.

"Like hell," Vyrl said.

The Arbiter held up her hand. To Kamoj, she said, "In this Inquiry you are under the protection of Imperial Space Command. No one can force you to do anything you don't want." Gently she added, "Do you understand what I'm saying?"

"Yes," Kamoj said. Why did they all talk to her as if she were a child? It made no difference. She had seen how well they "protected" her from Jax. Her body ached from their protection.

"All you have to do is ask," Tulain said. "But the request must come from you."

"I understand," Kamoj said.

"Do you still wish Governor Ironbridge to speak for you?"

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"Yes."

"Damn it," Vyrl said. "Major, can't you see she doesn't believe you?"

Tulain considered Kamoj. "We *can* protect you. No one can hurt you." She paused. "That includes Prince Havyrl as well as your husband."

"He's not her goddamned husband," Vyrl said.

Tulain turned to him. "Perhaps it would be better if we address that question through proper Inquiry procedures."

Vyrl scowled, but said nothing more. Ashman watched it all with piercing concentration, letting his minions probe while he analyzed. Kamoj suspected that he was, by far, the most dangerous person in the room.

Tulain's assistant set a black book-box on the table, then opened it to reveal a sheaf of parchments. Tulain lifted the top paper. "The question," she said, "is whether or not these contracts were willingly signed by Kamoj Argali. Her signature is in your hand, Governor Ironbridge."

"Kamoj can neither read nor write," Jax said.

"Is she aware of what you signed for her?"

"Of course. She was here when we discussed it."

"Prince Havyrl contends you coerced her agreement."

"Prince Havyrl is mistaken."

As the questions continued, the scene blurred for Kamoj. All she could think of was how much she wanted to sleep. But the Inquiry ground on and on. They covered every detail of her life since the day Vyrl had seen her in the river. The picture that formed was twisted around, yet nothing was false. She *had* said she dreaded the Lionstar-Argali merger. She *had* removed Vyrl's mask in the coach. He *hadn't* known her name, or even remembered he was married.

Then came statements from the palace staff. Vyrl's servants went far beyond the expected fealty. Again and again they expressed their devotion to him. They spoke of humane working conditions, of wages that allowed them to climb out of poverty, of Vyrl's talent with grains and livestock, his innovation with crop rotation, his cleverness in using the tiny flying lizards to aid the crops. All spoke of his kindness. Although Jax sat quietly, Kamoj felt his growing anger. He had never expected this.

But every statement stumbled when it came to Vyrl's drinking, his moods, his tormented nights. With his marriage to Kamoj, the stumbles became lurches.

Tulain read the comments of the housemaid who had come to help Kamoj the morning after her wedding night. "'She looked so scared,'" the maid said. "'So vulnerable. And she be clutching a doll. A *doll.* Like a little girl. I know his Highness be a good man, I know it truly. But this—I don't know what to say.'"

In the silence that followed, Jax said, "Kamoj and I weren't to marry for at least another two years."

Kamoj stiffened. What game was Jax playing now? He had constantly chafed at the delay in their marriage.

"Under the laws of our people," Tulain said, "she can't marry for another seven years. That's about eight of your short-years."

"What?" Vyrl stared at the major. "What are you talking about?"

Jax snorted. "Perhaps you need to learn your own laws, Lionstar."

Vyrl ignored him, his attention on Tulain. "She can marry when she's twenty-five."

"That's right," Tulain said.

"But she is now."

Everyone just looked at him. Finally Dazza said, "Vyrl, Kamoj is eighteen years old."

"That's impossible," he said. "Look at her. *Talk* to her. She's a grown woman."

"Her people were gengineered to mature early," Dazza said. "To increase the span of their useful years as slaves. That trait manifests in Kamoj. She is more ma-

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ture, in both mind and body, than what we associate with her age. Also, in this culture people marry at a young age. Kamoj is actually considered old for a bride. But legally she *is* a child."

Vyrl sagged back in his chair. Watching him, Kamoj felt his defeat. He knew how he looked. He glanced at her and flushed, as if he believed she too thought him a monster. She wanted to reassure him, but she knew better than to speak. Maybe he would sense her feelings, maybe not. He never seemed to catch them fully, only in pieces, and what she felt now, more than anything else, was tired.

Tulain picked up a blue paper and glanced at Vyrl. "This is your conversation with Colonel Pacal when you took Governor Argali riding." She scanned it, then read, "'Look at this. My wife. A farm girl like a virginal sex goddess out of an erotic holomovie, and all she asks is a simple life, a husband who doesn't beat her, and the freedom to walk in the woods.'"

When Jax turned his head away, Kamoj didn't think he was acting. Vyrl's words probably did offend him, though not for the same reasons everyone else looked uncomfortable. Jax considered it his right to beat her.

"It's not the way it sounds," Vyrl said. "I was drunk."

"It also says your stagman Azander had a bruise on his face where you hit him." Tulain paused. "What exactly did you mean by 'a husband who doesn't beat her'?"

"Saints almighty, Major, I was in the middle of a convulsion when I hit Azander." Vyrl's fist clenched on the table. "If you want to know what I meant about beating, ask him." He stabbed his finger in the air, at Jax. "He thinks it's his right. In bed, no less."

Jax rose out of his chair. "You will not speak of my wife that way."

Vyrl stood up. "She's not your wife."

"Gentleman, sit down," Ashman said.

Jax took a breath and let it out. Then he nodded to Ashman. "My apologies, General." He sat down, leaving Vyrl standing. After an awkward moment, Vyrl sat down as well.

Kamoj hated this. Jax was making Vyrl look worse and worse. Neither Tulain nor Ashman seemed disposed to speak in Vyrl's defense and she didn't dare. Dazza, however, could. Kamoj looked across the table, trying to send a silent plea to the colonel.

Dazza blinked at her. Then she turned to the Arbiter. "Major Tulain, a fairly easy way exists to establish the truth of at least some accusations being made or implied by both parties in this disagreement."

"Go on," Tulain said.

"I can examine Kamoj," Dazza said. "If she's been mistreated, I'll know. And I can probably tell by whom."

Jax tensed. "My wife has suffered enough indignities at the hands of you people. I will tolerate no more."

Vyrl leaned forward. "Are you afraid of what they'll find?"

"Why don't we ask Governor Argali?" Tulain said.

Kamoj gritted her teeth. She didn't want anyone touching her. The idea of being "examined" was revolting. All she had wanted was for Dazza to speak in Vyrl's defense.

"Why can't you all leave her alone?" Jax said. "Hasn't she suffered enough?"

Tulain regarded Kamoj. "Governor Argali, no one will force you to be examined. But you have the right. If it shows you've been mistreated, it could change the nature of this hearing."

"Change it?" Kamoj asked.

"At the moment," Tulain said, "the only evidence supporting Prince Havyrl's contention you are being coerced is that the servants at the palace were bound, gagged, and unconscious. Governor Ironbridge claims you asked they be restrained to keep them from stopping your departure. No one saw you leave, Morlin was down, and none of our orbital facilities were monitoring

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the palace at that moment. Our attention was on the fires and Prince Havyrl."

The fires. What was next in the path of Ironbridge's vengeance? "I want to stay with Jax," Kamoj answered. "I've told you that. Can't any of you hear? What else do you want from me?"

They were all watching her now: general, colonel, major. Too many titles. The priestess was frowning and the Ironbridge judge's face had gone hard.

Vyrl spoke softly. "Kamoj, last night you shouted for me. Why? If you wanted to stay with him, why did you call me back?"

"You misheard," Jax said.

"Everyone heard her," Vyrl told him.

The Arbiter spoke. "Prince Havyrl, you are the only one who thinks he understood her actual words."

"Damn it!" Vyrl hit the table with his fist. "I heard it because she *said* it."

Jax sighed. "What my wife shouted was an oath. I'm sorry this is so hard for you to accept, Lionstar. You heard what your overwrought mind wanted to hear, not what she said."

As Vyrl stood up, his face flushed, the Arbiter said, "Prince Havyrl, please. Sit down. Your outbursts help nothing."

Vyrl clenched his fists, but he sat down. Kamoj couldn't focus on his face. The room was dimming around her.

The Ironbridge judge spoke. "Governor Argali has repeatedly stated her wish to remain faithful to her husband. What more do you people require before you stop tormenting her? The only reason this Inquiry exists is because Havyrl Lionstar refuses to believe the truth. He is the one who took her to his bed without her consent."

Diskmail clinked, and Azander appeared at the table. The Arbiter glanced at him, then at Vyrl and Jax. When neither made an objection, Tulain spoke to Azander. "Yes?"

"I be sorry to interrupt," Azander said. "I wish to make a testimony."

Jax blinked. So did everyone else. Kamoj wondered what Azander was doing.

"What do you wish to say?" Tulain asked.

"When Prince Havyrl be near to dying in the large metal bird, Governor Argali spoke for him. She convinced them to take him home instead of to the *Ascendant*."

Tulain nodded. "Yes, we have that in your testimony."

"But it not be said proper on that parchment you read," Azander said. "It mattered to Governor Argali that he be well treated. The caring for him, she has it."

Dazza spoke to the Arbiter. "I know what he's saying, Cara. And he's right. I've seen it too. Kamoj has worked miracles with Prince Havyrl, reached him when none of us could even come close. His well-being genuinely seems to matter to her."

Jax spoke with unexpected affection. "Of course it matters to her. That is the kind of person Kamoj is. She cares about everyone. It is one of the many reasons her people respond so well to her." His voice tightened. "That Lionstar took advantage of this doesn't excuse his behavior."

Vyrl stiffened, but this time he controlled himself. None of the others seemed to know how to respond.

General Ashman spoke to Vyrl. "Did you know she was like that?"

"Not when I married her," Vyrl said.

The two of them kept looking at each other, fighting their own private war, which Kamoj suspected had been going on long before she met Vyrl. Finally Vyrl stood up. His guards tensed, and several Ironbridge stagmen dropped their hands to their belts, reaching for swords they no longer carried. Vyrl ignored them and walked away, stopping only when he reached a brazier near the edge of the tent.

He turned and spoke to Ashman. "Imperial Space Command went to great lengths to get me, lengths so extreme it boggles the mind. Why? Because I'm a great leader? A vital member of ISC? A

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brilliant strategist? No." He tapped his head. "Because I'm a Ruby *telepath.* So why do you doubt me now when I say I *know* what that thing"—He pointed at Jax—"is doing to Kamoj?"

"Because you've been in a telepathic catatonia for over a year," Ashman said.

Dazza spoke quietly. "Vyrl, she's the first person you've responded to since you came on board the *Ascendant.* How can *you* be sure of your reactions?"

He lowered his arm. "I'm sure."

"You're the only one who has picked up anything about abuse." Dazza motioned at his bodyguards. "They haven't."

"They aren't Ruby telepaths."

Ashman glanced at the Jagernauts, who had moved to stand near Vyrl. "What are you getting from her?"

"Fatigue," the first man said. "She desperately wants this Inquiry to end."

The second man nodded. "She resents ISC presence here."

That's right, Kamoj thought. She had given her answer and they had to respect it. More than anything, she wanted to *sleep.* She stood up, intending to demand an end to the Inquiry. Before she had a chance even to form the words, the world went gray and tilted sideways. The floor came up at her. Jax jumped to his feet and caught her as she collapsed. Sagging against him, she heard voices, something about Elixson, then more voices.

"Keep that hag away from her!" Jax ordered.

"Ironbridge, don't be a fool," Vyrl said. "Colonel Pacal is a healer, better than any you have here in camp."

Jax lifted Kamoj into his arms. Then the fresh smell of his bed enfolded her. Someone had washed the covers. Jax made a blur above her, wavering in a grey mist. Lying on her side, she let the mist thicken until she could no longer see him.

A change in the pitch of voices brought her mind back into focus. Jax and Vyrl were standing a few paces apart now, by the bed, their faces flushed, their voices rising in volume.

"—think you can take whatever you want," Jax said.

Vyrl clenched his fists at his sides. "That problem is yours, Ironbridge, not mine."

"Argali is none of your business."

Vyrl stepped forward, raising his fists. "We have laws—"

"Don't threaten me." Jax put his hands against Vyrl's shoulders and shoved him away.

They came together like wrestlers, grappling with each other. Jax stumbled back, and with a crash he fell across the Inquiry table, knocking over a lantern. He and Vyrl wrestled, locked together, Vyrl closing his hands around Jax's throat.

The Jagernauts were also moving, so fast their bodies blurred. One grabbed Vyrl and the other Jax, both guards straining as their captives resisted. They yanked Vyrl and Jax apart, one of the Jagernauts holding Vyrl by the arms, the other holding Jax.

Vyrl swore, struggling in his guard's iron grip. For an instant Jax looked too stunned to respond. Then he tried to jerk his arms away from the giant who had caught him, a move he could easily have managed with a stagman, had one of his soldiers been stupid enough to try restraining him. It made no difference to the Jagernaut. Only when Jax quit fighting did the *Ascendant* stagman let him go.

"You have no right," Kamoj said. She wasn't sure who she spoke to: Vyrl, Jax, or the people from the *Ascendant.* Perhaps all of them. She wanted everyone to leave. She tried to get off the bed, but her body wouldn't respond. It occurred to her that if she didn't eat soon, she would die.

The bed creaked. Then someone lifted her head into his lap, just as she had often done with Vyrl. She rolled onto her back and looked up to see Jax's face above hers. Kneeling behind her, he

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held her head on his knees while he stroked her hair with the same inborn rhythm she had used on Vyrl. A bruise was purpling his face and a large tear made a ragged hole in the shoulder of his shirt. He looked far more vulnerable than Vyrl, who stood at the end of the bed flanked by his gargantuan bodyguards with their antimatter weapons.

Jax raised his gaze to Ashman. "Why don't you all go back to your starships and leave us alone?"

The general spoke quietly. "You will have to let my doctor examine Governor Argali."

"No," Jax said.

Kamoj swallowed. "Jax . . . I don't feel well."

He stroked her hair. "Elixson can take care of you." Glancing at his healer, he said, "Why is she sick?"

"She needs food and rest," Elixson said.

"I fed her," Jax said. "Just as you said. Right after we spoke."

Elixson stared at him. "Sir, the Current has gifted you with an endurance well beyond normal folk, that you can go a day and more without food, walk through sleet and never notice, or ride for days without rest. Your wife is a hearty young woman, but compared to you anyone is fragile. You must learn to account for that. She has to eat four times a day, at least two of them full meals. She must sleep at night and wear warm clothes when she is exposed to the weather."

Dazza spoke in a cold voice. "Governor Ironbridge, exposure and starvation are considered methods of coercion."

"You don't call what you people are doing coercion?" Jax looked around at them. "Sending Argali a corporation I could never match even if I worked at it my entire life? Playing with the future and well-being of the Northern Lands as if it were nothing? Attacking my camp during a 'truce.' Threatening us with your soldiers and your weapons and your 'assimilation?' How many *times* does Kamoj have to tell you she wants you to go away?"

Dazza spoke softly. "Why, Kamoj? If you're sick or in pain, I can help."

"We don't want your help," Jax said.

Kamoj thought of the knife in Jax's boot and said nothing. She heard the rustle of camp outside, the snort of a greenglass, the shuffle of boots. Her mind was beginning to dissociate from her body.

Dazza pulled off her belt. Or not the entire belt, but part of it. When she ran her hand along the strip, it changed itself, turning into a flexible tube.

The colonel spoke to Jax. "This fires a needle that contains a drug. It won't harm you, but it will put you to sleep almost immediately."

Several Ironbridge stagman started toward her. As soon as they moved, Ashman motioned to Vyrl's bodyguards and they stepped forward.

Jax shook his head at his stagmen, a sign for them to back off. Relief flickered on their faces. Kamoj knew they would have defended Jax if he hadn't stopped them, but against the Jagernauts it was obvious they had no chance.

Jax spoke bitterly to Dazza. "So you lied about carrying no weapons. Why is it that I have no surprise at this deception?"

Kamoj could see how vulnerable he felt. He hid it well, but he more than anyone understood the capabilities of the *Ascendant*'s minions. No one seemed to realize the danger in making him feel trapped. They had left him no outs, and she was the one who would pay for it.

As Dazza raised her sleep tube, Kamoj felt Jax reach into his boot. Kamoj tried to roll away, but he held her in place. Then he slapped the knife against her throat.

"The only way you will have her," he told Vyrl, "is as a corpse."

Everyone in the tent froze. After a moment, Dazza spoke carefully. "Governor Ironbridge, don't hurt her."

"Kamoj, sit up," Jax said.

She dragged herself up to her knees,

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and Jax pulled her between his legs, so they were both kneeling, she with her back against his front. The flat of his blade chilled her neck. When he shifted position, the knife's razor edge nicked her skin. Vyrl stood at the foot of the bed, watching them, one fist clenched at his side. His bodyguards had their hands on their weapons, and Kamoj had no doubt they would protect Vyrl even if it meant her death.

Major Tulain spoke. "What do you want us to do, Governor Ironbridge?"

Kamoj wondered if even Jax knew the answer. What could he do except kill her? Then Vyrl would kill him. Then what?

Jax said, "Where is Baldarin?"

"Who is Baldarin?" Tulain asked.

"The archer who shot Prince Havyrl," Jax said. "Your people were holding him in Argali pending the decision on whether or not to 'press charges.' Where is he now?"

"He's still in Argali," Tulain said.

"What about the fires?" Jax asked. "Didn't you evacuate him with everyone else?"

"Argali didn't burn," Tulain said. "Only one outlying village was lost. We put out the other fires."

Jax made an incredulous sound. "It is truly amazing, what you people do. Stop fire in its tracks, fly above the sky, heal mortal wounds in a day. We are nothing to you, just a bunch of barbaric ex-slaves." His voice hardened. "I want to know what this means, 'pressing charges.'"

"It is part of our laws," Tulain said. "If Prince Havyrl chooses to press charges against the archer, the man will go on trial for attempted murder."

Kamoj felt Jax turn toward Vyrl. "Are you going to 'press charges'?" he asked.

"No," Vyrl said. "He can go free. Whatever you want."

"Good." Jax turned back to the Arbiter. "I, however, would like to press charges."

"Against who?" Tulain asked. "And for what?"

"Against Prince Havyrl Torcellei Valdoria," Jax said. "For the attempted murder of my stagmen last night, when he attacked this camp during a truce. I also want to file suit with your civil authorities to protest the way Prince Havyrl and your ISC have treated my people." He pointed at the Inquiry table with his free hand. "I want the evidence from this Inquiry made part of the record."

"Your testimony is being recorded," Tulain said. "So your charges are in the official record."

"That's not good enough." Jax motioned at Vyrl. "Your army would do anything to protect him. Without some guarantee, my comments will never make it past this tent."

General Ashman had his full concentration focused on Jax now. No clue of his thoughts showed on his face, but Kamoj suspected that even if no one else had yet realized it, the general was beginning to understand how much they had underestimated Jax.

"You have our guarantee of due process," Tulain said.

Jax snorted. "As I had your guarantee of a truce last night?"

"We're making full recordings of this Inquiry," she said. "We will provide you with copies of those recordings and a web system to verify them, as well as equipment to contact whomever you wish to represent your case."

"Not good enough," Jax said. "I have no way to stop you from setting your machines to break after you have what you want."

"What is it you would have us do?" Tulain asked.

"When your people returned my stagman to Ironbridge," Jax said, "a delegation came with him. Including a man called Drake Brockson. He told me he was part of an organization that represented worlds like ours in the Imperial Assembly, to ensure we weren't mistreated. I want you to contact him. I want his representation."

"Professor Brockson is an anthropolo-

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gist, not a legal counsel," Tulain answered. "He can't represent you."

"Then he will find me someone who can," Jax said.

Ashman spoke. "No."

Vyrl swung around to him. "What?"

"I will not submit to threats," the general said.

"Damn it, Ashman," Vyrl said. "He's not bluffing. He'll kill Kamoj."

"The answer is no."

Jax moved the knife on Kamoj's neck, "You have fifteen seconds to contact Brockson."

Tulain stared at him. "You would kill your own wife? The woman you've fought this entire conflict for? Doesn't that defeat your purpose?"

"Nine seconds," Jax said.

"If she dies," Tulain said, "you have nothing."

"Seven seconds."

"Are you willing to give up everything," Tulain asked. "Your realms, title, freedom, possibly your life?"

Jax turned the blade so its edge lay against a large vein in Kamoj's neck. "One second."

"Ashman, do what he wants!" Vyrl's voice snapped out. "*Now.*"

Jax paused, his knife against Kamoj's skin. Ashman turned to Vyrl, the two of them locked in a silent battle Kamoj knew had nothing to do with her or her world.

Still watching Vyrl, Ashman spoke in a harsh voice. "Major Tulain, contact Brockson. Have the transcript of this Inquiry transmitted to him."

Kamoj almost sagged with relief. Jax turned the knife, setting the flat of the blade against her neck.

Tulain contacted the *Ascendant* using her aide's book-box. Watching her "upload files," Kamoj felt a dazed detachment, as if she were an observer in a distant place. The knife made a bar of ice against her throat. No one spoke. No one moved.

The blow came from behind. Kamoj glimpsed a Jagernaut, not one of Vyrl's bodyguards but someone else. Jax must have caught sight of his approach, because he was already jerking away his arm when the Jagernaut grabbed for it. The Jagernaut caught cloth instead, ripping Jax's sleeve. He had also fired a sleep weapon, but either it missed Jax or had no effect; he kept moving, yanking Kamoj back on the bed until they faced the Jagernaut as well as everyone else.

"Liar," Jax spat at Ashman, stabbing his knife down at Kamoj's heart—

"*NO!*" Vyrl shouted. In the same instant, Tulain said, "Wait! Brockson is transmitting his reply."

Jax froze, the tip of his knife touching Kamoj's bodice. "And?"

A man's voice came into the air. "Governor Ironbridge, this is Drake Brockson. I will take your case and find you legal representation."

Watching General Ashman, Kamoj saw his sour look. Apparently Brockson's word was good.

Jax must have seen it as well. Softly he said, "Good." Then he let go of the knife.

The blade fell down Kamoj's front and onto the bed. Holding her around the waist, Jax sagged forward, letting his head rest against hers. "I'm sorry," he whispered. "If it makes a difference, I couldn't have done it. I meant what I said, but I misjudged. I could never have killed you."

"Saints almighty," someone muttered.

Jax held onto her, rocking back and forth, a ritualistic soothing motion Kamoj knew well, having often lapsed into it herself. With the same inbred instincts, she stroked his arms where he held her around the waist, offering comfort.

Dazza watched them with a strange expression, as if what she saw was breaking her heart. She raised her sleep tube and the expected hiss came from it. Although Jax stiffened, he made no further protest. When Kamoj felt his weight slump against her, she knew he had passed out.

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Ashman turned to Vyrl. "You said he wasn't bluffing."

"I wasn't sure," Vyrl said. "I couldn't take chances."

"Damn you, Valdoria," Ashman said. "With Brockson on the case we can't keep it quiet. Do you have any idea of the diplomatic and political repercussions this mess will create?"

"What would you have me do?" Vyrl asked. "You said it yourself. I've been in a telepathic catatonia. I couldn't be sure if he would kill her."

Kamoj extracted herself from Jax's embrace and shifted her position so she was behind him. Sitting cross-legged, she laid his head on her knees, just as he had earlier done with hers. When she began to massage his temples, everyone stopped talking and stared at them.

Vyrl looked as if his heart were being torn in two. Walking forward, he spoke softly. "Kamoj, you don't have to do that."

She cradled Jax's head, too dazed to answer.

As Vyrl knelt on the bed, Dazza warned, "Leave her be."

Vyrl shook his head. "She needs—"

"Valdoria, don't be an idiot," Ashman said. "Touch that girl again without her consent and I'll throw you in the brig myself."

Vyrl looked up at Ashman as if he wanted to punch him. But he stood up, moving away from Kamoj. Ashman's words echoed in her mind. *Consent. Consent. Consent.*

"Governor Argali needs to eat," Elixson said.

"Can you get her something?" Dazza asked. "Plain broth, if possible."

Elixson spoke to a stagman and the soldier left, the entrance flaps swinging back and forth after he was gone, back and forth, back and forth . . .

Kamoj swayed. Her arm was growing numb from supporting Jax's head. She shifted his weight, easing him to a new place.

"Gods," Dazza whispered.

Puzzled by the shock in the colonel's voice, Kamoj tried to focus on her. Dazza was staring at her arm. Looking down, Kamoj saw that when she had moved Jax's head, it had dragged the sleeve of her dress up past her elbow. There, in humiliating detail for everyone to see, was her shame, the bruises and welts that covered her skin.

Vyrl spoke to Ashman. "Now do you believe me?"

Dazza sat on the bed and spoke gently to Kamoj. "Governor Argali, I won't touch either you or Governor Ironbridge without your permission. But if you will allow it, I can treat those wounds." She swallowed. "And any others you have."

"Will it hurt?" Kamoj asked.

"I can anesthetize the area. What I did with your foot the other night. You won't feel anything."

"Nothing?"

"Nothing." In a healer's gentle voice, she added, "I'll make the hurting stop."

"Yes," Kamoj said. "Do that."

"We need to separate you from Governor Ironbridge. It that all right?"

"No."

"We won't hurt him."

"What will you do with him?"

"He's just sleeping," Dazza said. "We'll leave him here with his healer. He'll wake soon enough."

Kamoj looked up at Vyrl. "You told me that you would protect me last night if I asked for your help. I asked. This is what happened. If I ask again, will I get hurt again?"

Vyrl sat on the bed, ignoring Dazza's warning look. "If I could take back last night—" His voice caught. "I can't change what happened. But I can promise it won't happen again."

Moving with care, Kamoj set Jax's head on the bed. She slid closer to Vyrl and nausea swept over her. She waited for it to subside, then moved another hand span. The nausea surged. She was dimly aware of everyone watching her, but she didn't care. Right now all she

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could deal with was this journey of hand spans.

After an eon of starts and stops, fighting nausea, she came close to Vyrl. She looked up into his face. "I want to go with you." Reaching her arms out to him, she said, "Take me home."

Vyrl folded her into his embrace. No one spoke. No one told him to let her go. No one made a sound. His scent soaked into her, from his hair, his body, and his clothes. Tears ran down her face, but she didn't make a sound as she cried.

XIII
ROSE POOL
Asymptotic State

Moonlight lit the bedroom, flowing through the window above the desk. Kamoj sat with Vyrl, leaning against the headboard of the bed, surrounded by pillows, he still wearing his *slacks* and *turtleneck*, she in a farm tunic. The room's warmth and the potions Dazza had given her lulled her into a doze . . .

Voices woke her. Opening her eyes part way, she saw the room was lit now, and Dazza had settled into her usual armchair by the bed.

"—won't let you leave the palace," the colonel was saying.

"Why?" Vyrl asked. "Where do they think I'll go?"

"Nowhere," Dazza said. "That's not the point. It's a house arrest. The only reason Ashman let you come down here at all was because now that we know the truth, we realize it's better for Kamoj. But if you leave the palace, he'll order your return to the *Ascendant*."

"What, so he can 'throw me in the brig himself'?"

The doctor spoke quietly. "He acts in the best interest of the people. Your people."

Vyrl was silent for a moment. Then he said, "I know that. It doesn't make it any easier."

"If we could settle this mess with Ironbridge, Ashman would be a lot happier."

"Ironbridge doesn't want to settle. He wants to punish me." Anger edged Vyrl's voice. "He's a real piece of work. You would think after five thousand years, the owner genes would have disappeared here."

"Why? Genes aren't altruistic." Dazza tilted her head. "But you know, about forty-five percent of his DNA traces to slave stock. In some ways he's the ultimate product of the breeding program. His endurance is incredible. Can you imagine the metabolism he must have? He also has a triple stomach. How does it fit in his body? I would love to examine him. His DNA is like nothing I've seen."

"How do you know his DNA so well?" Vyrl asked.

After an awkward pause Dazza said, "From Kamoj."

Vyrl swore. "I can't believe she's letting him get away with it. How can she insist we don't use the evidence against him?"

Dazza answered in a quiet voice. "She and Governor Ironbridge love each other."

"Love, hell."

"They've a long history." The doctor paused. "I doubt he was violent all the time. Erratic positive reinforcement can be remarkably effective. The more he withheld his love, the better it must have felt when he finally gave it to her, and the harder she probably tried to attain it."

He made an incredulous noise. "Why isn't she *angry?* Why am I the only one who wants to see that bastard drawn and quartered?"

"She *is* angry," Dazza said. "What do you expect her to do, Vyrl? She's been in this situation almost her entire life, with no out, at least not in her view, as Argali's future leader. She probably felt she had to repress her anger for the survival of her people. She's not going to show it in ways you expect. She might

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turn it inward, become moody or withdrawn. Or she may lash out at you."

"Me?" He sounded startled. "Why me?"

"Because you're here." Dazza's voice gentled. "And because she trusts you. She knows you won't strike back."

He blew out a gust of air. "What should I do, then?"

"Just be yourself. Doctor Tager is going to work with her, but she will still need time. Don't pressure her."

"I won't."

They sat in silence for a while. Then Dazza said, "Gods know, I wish she would press charges."

"Maybe Jax would bargain," Kamoj said.

Dazza jerked at the sound of her voice and Vyrl jumped.

"You're awake," Vyrl said.

"How are you feeling?" Dazza asked.

"Better." Kamoj regarded her. "If I threaten to 'press charges' against Jax, he won't know I'm bluffing. He might reduce his complaint." It would infuriate him to discover an Inquiry could investigate what he had done with her in his bed. To lose face that way, in front of his people, was something she knew he could never tolerate.

"It might help," Dazza said.

"It will," Kamoj said. She knew Jax.

Rain drummed the window like an impatient giant. Lightning flashed, followed by a crash of thunder. Kamoj gave up being stoic and slipped out of bed. The beads in the archway clacked when she walked through them. In the main bedroom, rain pattered against the shimmer curtain in the window. As she climbed onto Vyrl's bed, a flash filled the room, followed by thunder, like a giant clapping his hands around her head. She scrambled under the covers and yanked them up until only her eyes showed.

"Hmmm." Vyrl slid his arms around her. "It's good to have you back." He sounded half-awake. "I had thought . . . "

"Yes?"

He hesitated. "That you annulled our marriage because you found out I was crazy."

"It isn't annulled. And you're not crazy."

"Damaged, then."

"Nothing is wrong with you."

Vyrl opened his eyes. "Don't look at me with blinders, Kamoj. Just because I haven't had a drink in a few days doesn't mean I no longer have a problem. It will be with me for the rest of my life even if I never take a drink again."

"Everyone has problems." She brushed her fingers over his cheek. "Yours are on the outside. Under them, you're a good person. Jax looks good outside, but underneath he's cruel. You're trying to solve your problems and he doesn't think he has any. He's the one who is damaged, Vyrl. Not you."

Pressing his lips against her hair, he murmured in a voice so soft, she almost didn't hear him. It took her a moment to realize he had said *thank you,* not in words but in her mind. Oddly enough, it felt natural, not alarming at all.

Aloud, all he said was, "I filled out the forms to alter my visa."

"Visa?"

"Permission to let me live on Balumil. Right now it's a technicality, since I'm in ISC custody. But eventually I will need documents for permanent residence here."

Kamoj stared at him, afraid to hope, afraid she had misheard. "You will live here? Always?"

His face gentled. "Yes. Of course."

"I thought General Ashman wouldn't let you stay."

"I do have to leave soon, for a while." He shifted her in his arms. "ISC is planning a mission to take my home world of Lyshriol from Earth's forces. They need me to pull it off, not only because I know Lyshriol, but also because the Lyshrioli people will follow me." Tightly he added, "But ISC can't hold me for the

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rest of my life, controlling where I go and what I do. I will come back, Kamoj. Soon."

She made herself ask, "What about your family? Your farm. Your children. Their children." And on down the generations that called him patriarch. "Your life."

He kissed her forehead. "I've already lived that life. Argali needs you, its governor, but my children are all grown."

"Hai, Vyrl." She hugged him, unable to find words to express her appreciation for the gift he had given her. Despite his attempt at nonchalance, she felt the depth of the love he shared with his family and knew how much he would miss them.

Vyrl sighed, holding her close. She turned her head up for his kiss, but he only brushed his lips over her hair. She hesitated, unsure now. Did he no longer want her because of what had happened with Ironbridge? Or because she didn't feel ready yet to be a wife to him? It unsettled her how much she needed to believe he would still want her when her emotions had healed.

He kissed her forehead. "Of course I do." Awkwardly he said, "You are just so young."

Dryly she said, "You, who married at fourteen, think *I'm* young?" She touched his cheek. "I've no interest in how your legal people count time. I neither think nor love like a child."

Softly he said, "And can you?"

"Can I?"

"Love. Me."

"Hai, Vyrl." Raising his hands to her lips, she kissed his knuckles. "Always."

His smile gentled his face. "I too, water sprite. Always."

For a while she lay in his arms. Then she asked, "Your people take longer to grow up, yes?"

He nodded. "Apparently your bodies pass through childhood faster than ours do. Your brains establish neural connections at a quicker rate, so your minds mature faster."

She could tell he was leaving out something. "But?"

He spoke quietly. "You lose a child's mental flexibility and learning capacity sooner. It limits your intellectual development. Which was probably the intent. It's why your people have so much trouble with education, why you struggle with complex concepts, and why you had trouble maintaining a more advanced civilization here."

Disappointment flooded her. "You mean I can never learn to read?"

His voice gentled, "Kamoj, I think you could learn anything you set your mind to."

"I hope so." She laid her head against his and closed her eyes. Thunder rumbled again, more distant now, less threatening . . .

She awoke alone in the dark. Then she heard a splash in the bath chamber. Going to investigate, she found Vyrl swimming laps in the pool. Moonlight poured through the stained glass window, filling the room with ghostly gem colors. The radiance reflected off the water and made patterns on the tiled walls.

Kamoj was struck again by his athletic grace. She recalled his question: *it is accepted for men to dance here?* And Dazza had referred to his "artistic temperament." Watching him, it finally made sense. Of course. Vyrl liked to dance. She had no doubt he did it well. Yet for whatever reason, it wasn't accepted for men where he came from. Such a simple matter, but it was something she could offer in return for his leaving his home to live on Balumil. Here he could dance if he wanted.

She imagined him at the harvest festivals, swinging her around in the central square of the village, or in the Dance of The Skylions, surrounded by the rest of Argali's people, everyone whirling beneath the aurora borealis. No more cowl and cloak, no more metal mask. Perhaps he would always have to wear a shim-

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mer that sheathed his body, but once her people knew him, knew the good man beneath it all, they could accept his differences.

As Kamoj knelt by the pool, Vyrl swam over to her.

"We have skylions in the mountains," she told him. With a grin, she added, "I've heard it said they don't like getting wet," and gave him a hearty splash.

He caught her hand. "Ah, but nothing is so beautiful as a rose covered with dew." Then he yanked her into the pool.

She thrashed to the surface, sputtering. "Hai!"

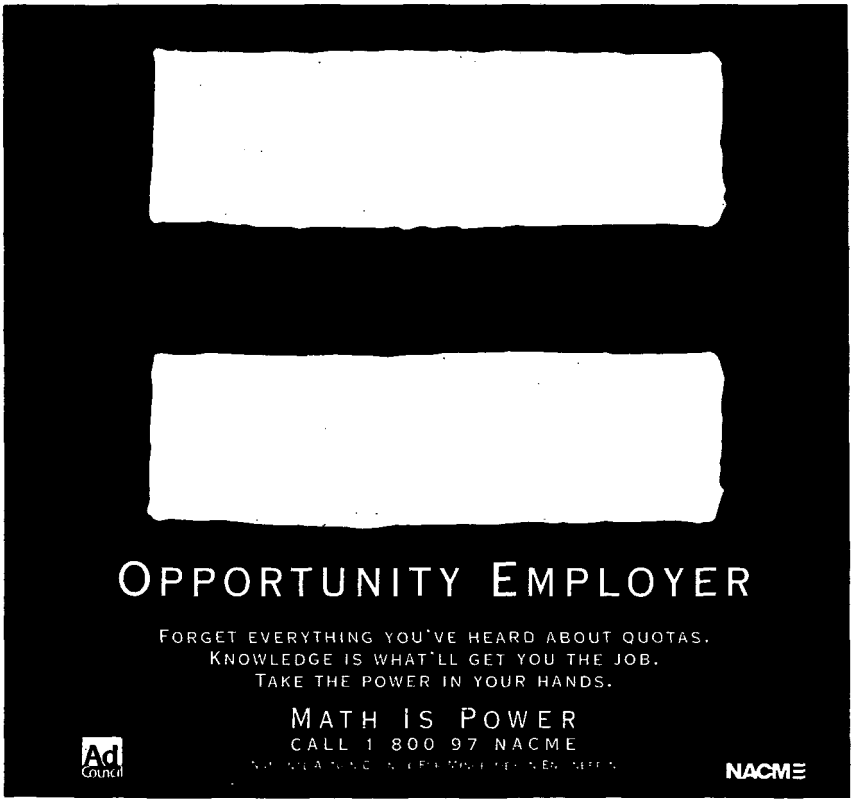
He grinned. "I get clumsy sometimes."

"Clumsy, hah!" She splashed him again, then took off like an ottermock, arrowing under his body as she blew bubbles at him.

They played in the pool for a while. Then they held each other as they drifted around the fountain, passing in and out of the moonlight. When they nudged against the stairs, they settled on a step, their bodies submerged in the water.

So they sat in each other's arms, their healing begun. ■

"The Quantum Rose" and its sequel will be published together as a hardcover by Tor, probably in 2000. Asaro, a theoretical atomic and molecular physicist, also hopes to include an author's note at the end of the book about the various ways quantum scattering theory is used in the story.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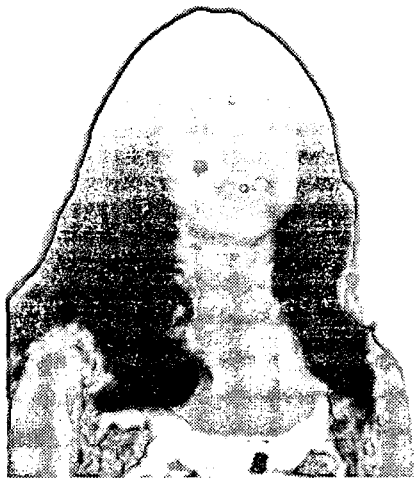
BIOLOG Jay Kay Klein

Fifty years ago, science fiction's historian Sam Moskowitz introduced *Analog* author L. Ron Hubbard as a Renaissance Man. This familiarity with the sum total of Western Civilization's arts and sciences would allow him today to introduce *Analog* author Catherine Asaro as a Renaissance Woman.

Born and raised in the San Francisco area, long before she became a two-coast scholar with degrees from UCLA and Harvard, she came under the influence of the man who was central in editor Stan Schmidt's editorial of June 1998: her father, Dr. Frank Asaro. He was the physicist the Alvarezes turned to for the difficult iridium assay of the half-inch K-T boundary layer, and he helped to revolutionize whole chunks of sciences. Importantly, too, he introduced his daughter to the SF he loved to read.

Catherine's contribution to *Analog* is not just in the magazine's expected impeccable science, but especially in what has always been in short supply from most technology-dominated men: strong, well-rounded, and sympathetic female characters. Unused to this seamless integration of brains and beauty, sex and sensibility, and diamond-hard science with fiction, men under the influence of raging male hormones have often tagged her writing "feminine" and "romantic."

After switching from a dance major, Catherine grabbed a Chemistry B.S. *summa cum laude* at UCLA then went on to the hard stuff at Harvard with an M.A. in physics and a doctorate in chemical physics. She has been a physics professor, research physicist, president of Molecudyne Research, and a ballet teacher.



Catherine Asaro

Romance permanently entered Catherine's life when she took a break from the treadmill of assembling a doctoral thesis. While at a Christmas party at the Harvard-Smithsonian Center for Astrophysics where she had a tiny office, she caught the attention of a recent arrival from the University of Texas who was on a post-doc fellowship. He later arranged several chance meetings and an impromptu date at a pizza parlor and mentioned he had a piano but had no place to put it. She said she wished she had a piano in her office to play after hours. A few days later, she walked into her closet-sized office and found the only piano every installed in an astronomical observatory. After two weeks of her playing Mozart, Bach, and Joplin for him and one home-cooked meal they decided to marry. The now live in Columbia, Maryland.

(continued on p. 238).

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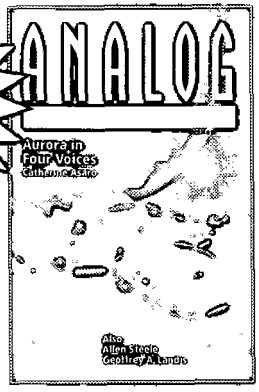

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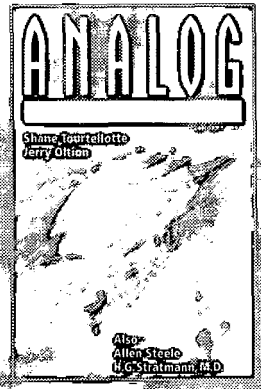

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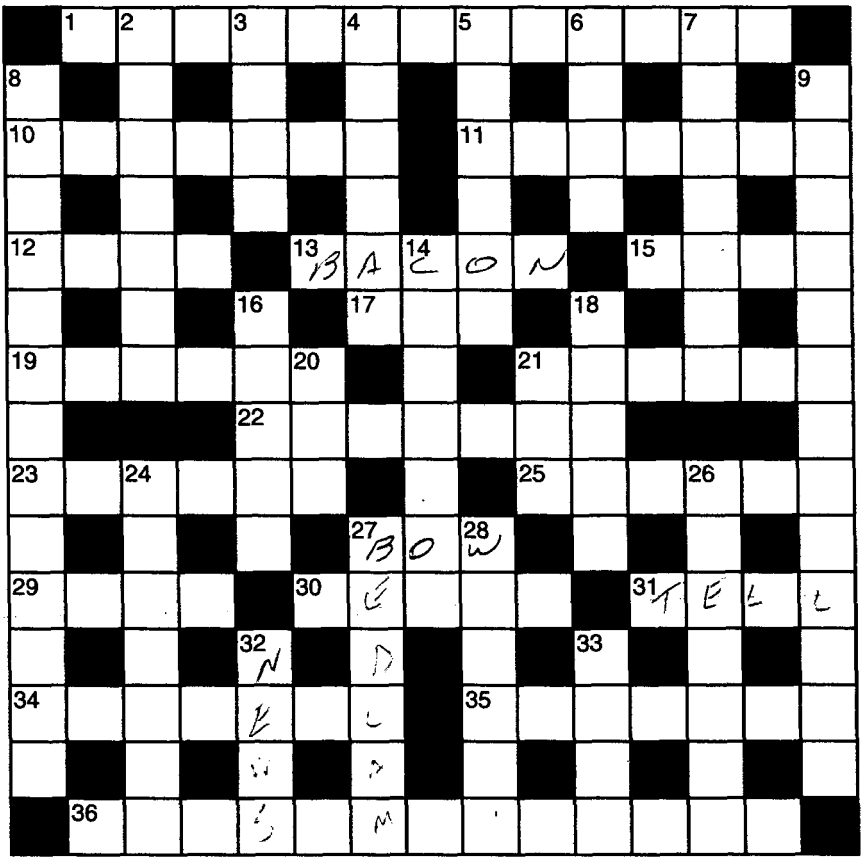
CRYPTIC CROSSWORD



by James P. Hogan

Answers on p. 233

Across

1. Heavenly sounds of a godly calling? (5, 2, 6)
10. Sudden riser from star input altered. (7)
11. Cuba and Rio are united? Sounds like rain, dear. (7)
12. Small step for man in spaceship. (4)
13. Does Roger or Francis bring it home? (5)
15. Hang onto broken vase. (4)
17. Conflict inherent in software. (3)
19. State of USA, sir, but not in America. (6)
21. Sound made by quakes. (6)
22. Upland formed out of block of crust with gold. (7)
23. Fly from two sets. (6)
25. 17 Across joins 21 Down in center that attracts Poles. (6)
27. Ship's leading part doesn't take one. (3)
29. A bite heard twice in Chattanooga? (4)
30. Ten begin and none return. It's a gas! (5)
31. Did William so inform? (4)
34. Feast supplied by the great Wellington. (3, 4)
35. Weaving of tactile elements. (7)
36. Robert's moon—a tough one. (5, 8)

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Down

2. Fashionable cults of diminutive class. (7)
3. I leave the reformed giant an example of 2 Down. (4)
4. Walt rises under oxygen and uranium ban. (6)
5. Slice of insect organ. (6)
6. Weary of being on the road? (4)
7. Bony containment of rage about One B.C. (3, 4)
8. Jolter and stayer carry message for those who follow. (6, 7)
9. Presumably, the Force that he trusts in is antigravity? (4, 9)
14. Nothing in the box? Could be Shoe. (7)
16. Tahiti psychotic partly a little wobbly. (5)
18. No difference in wine quality. (5)
20. Algerian grainless brew. (3)
21. Old aphorism cuts one way. (3)
24. Atlas's daughter lends ear to disordered Celt. (7)
26. Varieties of spies around English and Chinese capitals. (7)
27. Madhouse blamed in disorder. (6)
28. Mars or Venus, for example? Fifty put into words. (6)
32. The latest from four directions. (4)
33. Sailor becomes famous with direction. (4)

Some Hints:

Rather than presenting simple definitions or questions of general knowledge, the cryptic style of crossword uses clues typically built around wordplays, metaphor, and double meanings. It appeals to those who enjoy the challenge of creatively working out a solution as opposed to either just knowing an answer or not, or having to guess at it.

A clue will frequently comprise of a definition of the answer along with directions for constructing it—very likely written in a misleading way to obscure which is which. Thus, the answer to "Satellite condition for descent on the house" turns out to be "Freefall"—the condition of an orbiting satellite—constructed from "on the house," meaning "free," and "descent," i.e. "fall."

Always look for possible meanings of words other than the apparently obvious. Thus, "Die of cold" could refer to an ice cube; "Tower of strength" to a horse towing a barge; "flower" might be a river—something that flows—and not a plant. Words like "confused," "rearranged," "could be" occurring in clues are often hints to the existence of an anagram. When considering anagrams, be aware that "one" may indicate the letter L while "quarter," "point," or "direction" may indicate the compass points, N, E, S, or W. Likewise, "note" could mean any of the musical notes: A, B, C, D, E, F, or G. The answer to "Sailor becomes famous with direction" thus turns out to be "Star": S plus "tar," a sailor. Or again, "Note agate mixed in the drink" gives the solver instructions to "mix"—form an anagram from—"note" (in this case B) and the letters of "agate" to give something found in a drink: "Tea bag." Roman numerals, C, D, L, M, X are often used similarly.

Words like "back" or "returns" can indicate a word or letter sequence written backward. For example "Drab" as the answer to "Minstrel returns, dull and colorless" ("bard" written backward). Similarly, "up" can indicate a word or letter sequence reversed in a Down clue. Phrases like "seen in," "found in," or "held by" can indicate the solution to be literally in the clue; thus, "Stance," the answer to "Position embraced by earliest ancestors" was there all the time in earlieST ANCEstors.

There are no rigid rules. The idea is to exercise ingenuity and have fun. A name frequently implies a diminutive form, such as "Ed" or "Ted" for Edward. "Said" or "sounds like" usually indicates homophones, such as "rain dear" and "reindeer." "Head," "tail," "beginning," "end," and so forth can refer to the first or last letters of a word, e.g. "Rarity" as the answer to "Odd parity has new beginning." Occasionally, a construction has no other merit than to inflict on the solver some exceptionally warped interpretation of a meaning that the compiler was unable to resist.

Figures in parentheses after a clue give the letter count of the words making up the answer. Thus (3, 2, 6) would indicate a three-word solution of 3, 2, and 6 letters.

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Nocturne for a Dangerous Man, Marc Matz, TOR, $25.95, 448 pp. (ISBN: 0-312- 86935-5).

A Deepness in the Sky, Vernor Vinge, TOR, $27.95, 607 pp. (ISBN: 0-312-85683-0).

Finity, John Barnes, TOR, $22.95, 303 pp. (ISBN: 0-312-86118-4).

Godshome, Robert Sheckley, TOR, $22.95, 251 pp. (ISBN: 0-312-86804-9).

Packing Fraction & Other Tales of Science & Imagination, Julie E. Czerneda, ed., Trifolium Books (250 Merton Street, Suite 203, Toronto, ON, M4S 1B1 Canada, 416-483-7211), $4.95, 122 pp. (ISBN: 1-895579-89-9).

No Limits: Developing Scientific Literacy Using Science Fiction, Julie E. Czerneda, Trifolium Books (250 Merton Street, Suite 203, Toronto, ON, M4S 1B1 Canada, 416-483-7211), $21.95, 122 pp. (ISBN: 1-895579-94-5).

Alien Abductions: Creating a Modern Phenomenon, Terry Matheson, Prometheus Books, $26.95, 317 pp. (ISBN: 1-57392-244-7).

Darwin among the Machines: The Evolution of Global Intelligence, George B. Dyson, Perseus Books, $15, 286 pp. (ISBN: 0-7382-0030-1).

PUBLISHERS PLEASE TAKE NOTE: The Post Office and United Parcel Service would much prefer that you pay attention when I send you notices that my address has changed. I'm still in the same house, but the address is now Box 2724, RR 4, Belfast, ME 04915. If you continue to use older addresses (Box 316, Box 705, Box 805 . . .), books will not reach me reliably. And books that don't reach me don't get reviewed.

AUTHORS: The same address works fine for you, too, if you wish to be sure I get a copy. Bear in mind, however, that I write these columns at least six months before they appear in print. It's OK to send manuscript—on paper or on disk (PC, not Mac; save as text; HTML works nicely too)—once the book is accepted and scheduled. I'll need price and ISBN, too.

If you hang out with writers, you will hear them moan a great deal about how tough the business is these days. It's hard to sell a first novel, it's hard to sell a second (especially if the first wasn't a bestseller), it's hard to get an honest accounting out of a publisher, and it's hard to make a living. "Don't give up the day job," they tell newcomers to the business. "You'll need it."

To tell the truth, though, it's not that hard to sell a novel. If you're willing to pander to whatever the market wants—you can find a niche cranking out movie and TV tie-ins and endlessologies (most of which I ignore here). And if you're very, very good, there's a niche just waiting for you.

Marc Matz surely fits into the second category. He has a ways to go—he's not flawless—but his **Nocturne for a Dangerous Man** is astonishing for a first novel.

The man of the title is Gavilan Robie.

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He is part American Indian, part Basque (not an impossible combination—lots of Basque shepherds went west), a lover of art and music who speaks many languages. But don't make the mistake of thinking he must be some posy-sniffing pantywaist. Robie has as many identities as martial skills. Once he was a top secret agent. Now he is "a freelance fine-art recovery specialist [doing] everything from giving advice on ransom negotiations, dealing with those fences who handle stolen art, to acting as a go-between, to attempting to physically retrieve the artwork." And sometimes he "goes hunting . . . to recover people who are lost and need, badly, to be found."

Enter Groupe Touraine, a company involved in a plan to develop the Congo basin. Environmental terrorists—they call themselves the Erinyes, the Furies—have kidnapped one of its people, Siv Matthiessin—young, beautiful, supergenius, and lover of chief honcho Olivia Fouchet. The Erinyes want money and an end to the Congo project. And even if they get it, Matthiessin will surely die.

Enter Robie, setting aside his antique cello and thoughts of his own estranged lover. He begins to gather data and form a picture of financial and political intrigue. Banks are involved, international corporations, crime syndicates. Soon he has recruited old friends, called in markers, and amply demonstrated his skills, both as fighter and as negotiator. Meanwhile, Matthiessin is isolated, surrounded by fanatics who have pumped her full of gengineered bacteria designed to aid interrogation, and is apparently quite helpless. And Matz has created a portrait of a world that seems to need all the Robies it can find, for as Matz says, fine-art (and people) recovery is a growth industry. Crime at this level is rampant. But the novel's subtext says there is also something else Matz appreciates and wishes to recover: the beauty of nature, being lost to rising seas, rampant development, and human appetites.

The Erinyes have their ideology, but it is the ideology of the antiabortionist who can call murder "pro-life." Robie's ideology, if he can be said to have one, is aesthetics and decency, and in service to those ideals, he can throw an awfully mean hardball.

I hope Matz has more tales of Gavilan Robie to share with us.

Vernor Vinge is the kind of writer who makes other writers contemplate *seppuku* out of shame for their pretenses of competence. Put another way, if all writers were as good as Vinge, there would be no population problem, no Middle East problem, and no international tensions over Kosovo, Iraq, Taiwan, or Pakistan/India, and every industry except the publishing industry would be limping dreadfully. Everyone would be far too busy reading to engage in other activities!

Vinge's last masterwork was *A Fire upon the Deep*, which won the 1993 Hugo Award. Now **A Deepness in the Sky** puts a blinding shine upon an already solid reputation. The time is so far in the future that Old Earth has been depopulated (due to overpopulation and resource depletion) and resettled four times. Indeed, history has shown that planetary civilizations are woefully short-lived although, thanks to humanity's dispersal among the stars, there are always human civilizations. They die, but they spring up atop the ruins like poppies in a field, and sometimes they sprout in new ground, only to die in turn.

This is the context of the Qeng Ho, a very loose confederation of interstellar traders. They travel in slower-than-light ships and spend decades and centuries in coldsleep. Since the human lifespan is now centuries long, they can live for millennia and can cultivate the Long View. Indeed, that was the immense contribution of the legendary Pham Nuwen, who long ago established the fabric of human civilization in the form of continuing interstellar broadcasts that

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let any newly risen civilization tap into the common culture, gain technological boosts, and become ready for trade.

Now meet Sammy Park, fleet captain come to Triland on a manhunt. He seeks "The Man," finds him aged, decrepit, in hiding from some past shame, tells him of a planned expedition to investigate hints of technological activity near the mysterious "OnOff" star (which shines for a few decades and then turns off for two centuries), and invites him along. Note, he says, that another expedition is on the way too, from a group that calls itself "Emergents," apparently a high-tech tyranny.

"I'll come," says The Man. "But take guns and rockets and nukes, Sammy. Lots and lots of nukes."

"Yes, sir," says Sammy. "And now let's board my flagship, the *Pham Nuwen*."

A century and a half later, the fleet is orbiting Arachna, seeing the alien civilization below, built by nonhuman Spiders, and the Emergents are arriving. All seems good will, and joint efforts are planned. But then the Emergents show their true colors in treachery and war. They nearly destroy the Qeng Ho expedition, but before their planted plague can do its job, the traders show remarkable ferocity. The Emergent victors are too crippled to return home and must lurk in orbit around Arachna until the Spiders can create a technological base capable of building starships. Then the tyrants will take over, and it is already clear that they love to kill and torture.

The surviving Qeng Ho, including one Pham Trinli, an old and cranky SOB, are enslaved, turned with the aid of a mind-control virus into "Focused" computing machines, or coopted. The Emergent leader, Tomas Nau, is excellent at deceit and manipulation. There is resistance, but it must be very quiet; resisters who make themselves obvious vanish. The characters who remain live in tragedy.

Meanwhile, down on Arachna, a hypergenius named Sherkaner Underhill is frothing with the ideas of an Einstein, a Fermi, an Edison, pushing his entire world into the technological future as rapidly as he can. The humans approve, and as Focused translators report on his doings and his family, as conveyed by radio, there is a growing sense of the Spiders as people, no matter what they look like. The reader writhes at the knowledge of what the Emergents plan for them and cheers at every hint that the resistance may be able to prevail despite everything.

Vinge's great triumph here is that he has created a living world. The reader cares about an immense number of characters, both human and alien, and if he or she cannot really like the Emergent villains, it remains possible to empathize, to understand where they are coming from, and to admire their skills and dedication. There is also a clear sense of the vast sweep of future history, space, and time that figures so prominently in science fiction, from Olaf Stapledon to Arthur C. Clarke, Gregory Benford, David Brin, and more.

I'm betting that Vinge will have another Hugo for this one, and perhaps a Nebula as well.

Some time ago, John Barnes's "most loyal reader" asked him "to write an adventure story, with a reasonably happy ending, only a little weird." So he hit her with **Finity**.

In which protagonist Lyle Peripart, mild-mannered professor and American ex-pat in a world where the Nazis won World War II, established Reichs all over the world, and exterminated all the "inferior" races, flies his robotic jump-ship from Auckland, New Zealand, to Surabaya for a job interview. The interviewer is Geoffrey Iphwin, as jumpy as a TV screen with the vertical hold on the fritz, who says he badly needs a specialist in abductive math (versus deductive and inductive) to pick good ideas to work on, gives Lyle the job, and sends him off to meet his girlfriend Ellen in

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Saigon. However, the jump boat says Lyle has already come back and flown to Saigon, girlfriend says he did the same, a Gestapo thuggess shows up to beat on him, and when Lyle and Ellen finally make it to their restaurant, a German tourist charges in waving a gun, Ellen turns into a special agent out of a James Bond flic, and the tourist's body turns out to be the thuggess all over again.

Yup. Just "a little weird." And the fun's just starting, for as the Astute Reader is already realizing by now, this smells a lot like parallel worlds slopping over their boundaries, mixing up histories, characters, and plot lines *ad libitum* (and just you wait till you meet the kinky variation Barnes imagines for Ellen at one point). A serious problem for anything remotely resembling baseline reality, and Iphwin is out to fix it if it can possibly be fixed.

But just who *is* Iphwin? Why are the worlds so jittery? Who's the thuggess and why does she keep on popping up even after she's been shot? What does this all have to do with quantum computers and the Heisenberg Uncertainty Principle and I wonder who's Schrödinger now? Is America a Reich, a Puritan Paradise, a People's Republic, or . . . Hey, wait a minute! Have any ex-pats tried calling home lately? *Is* there an America, and if there isn't, where the hell did it go?

This one's the great Heisenbergian novel, quantum to the max, a great deal of fun if you can keep your head from spinning off your shoulders, and well worth your attention.

Don't miss it.

Robert Sheckley has had a long and successful career in science fiction and fantasy. Not everything he writes is to everyone's taste, but I think most of us can remember fondly something with his name on it. And that is enough to justify looking at anything new he sends our way.

So here's **Godshome**. The publisher touts it as light, slick, witty, and fun—all Sheckley trademarks—but omits the word "memorable." That is surely significant, for it isn't.

The protagonist, Arthur Fenn, is an underemployed professor of mythology, so incompetent and feckless that when fate drops in his lap the key to conversation with the gods, he uses it, stumbles into the Home for Wayward Gods, locates the padded wall ward, and meets Leafie, "the premier god of the Dardanian Scythians," who were wiped out shortly after they put him in charge, asks Leafie to bail him out of a financial difficulty, and grants him permission to do whatever he likes on Earth.

Well. Arthur gets his wish, but Leafie is as crazy as only a god can be. Mischievous, too. Not to mention duplicitous, unethical, greedy, power-mad, and fond of blood. Earth is in trouble. So is the universe. The Old Gods therefore call up a new boy to set things right, but that doesn't work out very well. Soon an alien fleet is on its way to trash the planet, and Arthur—empowered and emboldened by his love-goddess girlfriend, Mellicent—must access the cosmic help file to undo the damage he has wrought.

Mythology, gods, aliens, help files. It's witty—it made me smile or chuckle quite a few times—but it's all a bit of a hodge-podge, with new items dropped into the pot apparently whenever the author grew desperate. I suspect you will be much happier with it if you wait to pay the paperback's price.

If you teach science at the middle or high school level, I have an interesting pair for you. Julie E. Czerneda, an SF writer who has written science education materials for years, has assembled **Packing Fraction**, an anthology of five simply told stories by Charles Sheffield, Jan Stirling, Robert J. Sawyer, Josepha Sherman, and Czerneda, plus a pair of poems by Carolyn Clink (Sawyer's wife). **No Limits: Developing Scientific Literacy Using Science Fiction**, the teacher's edition of the book, repeats

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the stories with a host of teaching tips and exercises that look like just the thing to get the kids interested in both science and SF.

The ambition is laudable, the package is outstanding and affordable, and Czerneda has done an excellent job. Yet there is an unfortunate side to this—and it is perhaps unfortunate less because of the books themselves than because of what they say about their target audience. As I noted, the stories are "simply told." Indeed, they are so simply told that they seem to me more suited to elementary than to high school, whose denizens should be up to reading material as complex as anything in this magazine or on the bookstore shelves. Some are, of course, and perhaps these books aren't aimed at them. Yet I still find it a depressing comment on modern education that these books can be sold to the high school market.

Color me grumpy. Books like these may be just what we need to upgrade that market. Though it might be too much to ask that the general populace can ever be scientifically literate and rational enough to make our next book's raw material go away.

I presume that you are aware of the alien abduction phenomenon. After all, some 3.7 million Americans may believe they have been abducted and even raped by space aliens (and for most it was a positive experience!). You may even be one of them!

Or perhaps you are more inclined to wonder how so many people can be so horribly mutton-headed. After all, the evidence is problematic at best, limited to self-report, amateur hypnosis, and loud cries of "Cover-up Conspiracy!" Yet there must be *something there* . . . mustn't there?

Well, maybe, but that something needn't have much to do with UFOs. That is, the relevant question is less the identity or purpose of the space aliens than the reason why so many people share belief in aliens and abductions. And here Terry Matheson's **Alien Abductions: Creating a Modern Phenomenon** may be helpful. Matheson is a Canadian literature professor who approaches the various abduction "studies" as narrative rather than journalism. They are, he says, a myth in the making, driven by "the need to create a narrative that will explain an aspect or aspects of a culture to itself." It has something to do with society's responses to technology, though "it would be a mistake to conclude that there is no more to the abduction myth than a mere critique of technology in itself . . . . The manner in which that technology is being used by those in power is also of considerable importance . . . . the myth . . . reflects our apprehensions concerning the intrusiveness of all manifestations of such power in our lives. Practically speaking, the aliens' power bears an unmistakable resemblance to the ubiquitous tentacles of modern bureaucracy." It expresses a prevailing paranoia in "an undeniably dark and sinister age, where there are few if any certainties to sustain us."

I'd rather think that the aliens were really there, for then I could continue to hope to be abducted myself (wouldn't you too like a ride on a saucer?). Lacking that, this book is a very interesting treatment of the phenomenon, with the added benefit that it summarizes the reports of John Fuller, Raymond Fowler, Budd Hopkins, Whitley Strieber, and more, and thus gives you a chance to survey the abduction literature without having to dedicate a year to the chore.

In **Darwin Among the Machines**, George B. Dyson, the son of renowned physicist Freeman Dyson, gives us an extended rumination on the evolution of intelligence in the fruits of human artifice since well before Charles Darwin put the nail in special creation's coffin.

He begins in the seventeenth century, when Thomas Hobbes wrote *Leviathan* to draw parallels between

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animal and civil life, to say that in a mass of interacting, mutually adjusting parts there is a sort of intelligence. Hobbes was not well received by those who thought intelligence was particularly human, and that reaction has continued to echo down to the present day (notably by several letter writers in the January 1998 *Analog*, which arrived just as I was finishing Dyson's book). Intelligence is not something for animals or for machines, which at best can only mimic the real thing.

Dyson would not agree. He traces the history of the basic idea from Hobbes through Samuel Butler's (of *Erewhon* fame) criticisms of Darwinism, early calculating machines and speculations on the nature of mind, to Alan Turing, John von Neumann, Norbert Wiener, and the dawn of the computer age, when many of the basic questions and claims became explicit. He tells us of the first experiments on artificial life—not Tom Ray's work in 1990, but Nils Barricelli's in 1953! He reminds us that natural selection is not really about survival of the fittest, nor even reproduction of the fittest, but rather *persistence*, which can be attained by learning, revision, and redesign, a view that applies quite well in the technosphere. Thus the networks we have created—especially in conjunction with us as symbiotic partners—already embody a genuine intelligence, even though it may not be one we can readily recognize.

And he does not hesitate to say that "we have created a digital wilderness whose evolution may embody a collective wisdom greater than our own." From this, one can easily step to the thought that if humans plus their networked computers comprise a genuine and greater-than-human intelligence, then if we ever lose the machine component, the loss will be most comparable—in terms of what can happen to a single human intelligence—to a massive stroke.

This is a very useful book for all those who can't get past the idea that humans occupy a special position apart from the rest of the universe. □

Cryptic Crossword Answers (from p. 226)

Across

1. RINGS OF SATURN: planetary (heavenly) rings
10. UPSTART (fast riser) = STAR in(side) PUT altered (anag)
11. CARIBOU = CUBA + RIO united (anag); a reindeer,
12. PACE(small step)—in(side) sPACEship
13. BACON, name of Roger and Francis; also stock saying
15. SAVE (hang onto) = broken (anag of) VASE
17. WAR (conflict)—in softWAre
19. RUSSIA= state of(anag) USA SIR
21. SOUEL (sound) made by (anag) QUAKES
22. PLATEAU (upland) = PLATE (block of Earth's crust) + AU (chemical symbol)
23. TSETSE (fly) from (anag) SET + SET
25. WARSAW + WAR + SAW; Polish population center
27. BOW (ship's front); doesn't take (stage) bow.
29. CHEW (bite) "heard" twice in "Chattanooga Choo-Choo," song title
30. XENON (a gas) + X (Roman 10) + ENON ("none" turned around)
31. TELL (William): also means "to inform"
34. EAT WELL (to feast) supplied by gREAT WELLington
35. LATTICE (weaving) = TACTILE elements (anag)
36. HARSH MISTRESS—from Robert Heinlein's *The Moon is a Harsh Mistress*

Down

2. INSECTS (biological class of small members) = IN (fashionable) + SECTS (cults)
3. GNAT (example of insects) = reformed (anag) GIANT minus I
4. OUTLAW (ban) = O + U (chemical symbols) + WALT written upward
5. SECTOR (slice)—of inSECT ORgan
6. TIRE (to weary); also, auto tire—on the road
7. RIB CAGE (bony containment) = RAGE about (around) IBC
8. BUMPER STICKER (jolter, stayer)—carries message for following cars
9. LUKE SKYWALKER; the "Force" in *Star Wars*
14. CARTOON (maybe "Shoe") = O (nothing) in(side) CARTON (box)
16. TIPSY (a little wobbly) forms part of TahITI PSYchotic
18. EQUAL (no difference)—in wINE QUALity
20. ALE (brew) = ALGERIAN brew (anag, doubled meaning) less GRAIN
21. SAW (old aphorism): also cutting tool
24. ELECTRA (Atlas's daughter in mythology) = EAR + CELT disordered (anag)
26. SPECIES (varieties) = SPIES around EC (capital initials of "English" and "Chinese")
27. BEDLAM (madhouse) = BLAMED in disorder (anag)
28. WORLDS (e.g. Mars, Venus) = L (Roman 50) put into WORDS
32. NEWS (the latest)—spelled from the four compass directions
33. STAR (famous person) = S (compass direction) + TAR (sailor)

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BRASS TACKS

Dear Dr. Schmidt:

I read with great interest your column on "Time-Unbinding" (February 1999); if anything, the problem is worse than you relate. You mention ignorance and stupid arrogance as causes. I'd like to suggest several more. One is a breakdown in the social mechanisms that used to connect people with their pasts.

Consider the way families have fragmented these days in the U.S., where so often different generations live in different areas of the country. Contrast this with the extended family that prevailed in earlier times, where several generations might live under one roof or at least in one community. Look at areas of the world where populations are shifting from rural lives to cities in search of livelihoods. Consider how economic development can render traditional livelihoods non-viable. This disrupts both families and communities.

Consider how many children in the U.S. are now growing up with no stay-at-home parents. This intensifies the effect of isolation. Many of today's youth simply do not have the degree of interaction with their parents that previous generations did, in seeing how their parents both live and work.

The net effect is that people have less and less direct experience in their own lives with anyone other than their own-age cohorts. With decreasing contact with people who are not only aware of the past but have lived in it (past being a relative term here), how likely are they to appreciate what they are missing?

Another factor is trends in the economic environment. Mergers in the business world, and the displacement of locally owned and operated businesses by large generic commercial chains have several effects. There is a loss of institutional memory, and a distancing of individuals from connection with what used to be a far more intimate workplace experience. For example, consider the vast number of railroads which used to exist around the world and the associated history, community, and lore each one had. Consider how much of that has been lost as they've been bought out or have gone out of business.

Consolidation in the entertainment and publishing industries is also taking a toll. Something that does not have a potential audience big enough to get the attention of a huge conglomerate will either be cast off or never be heard from in the first place. You cited writers like Heinlein and Simak; what of their less well-known contemporaries?

Look at the business world of today , where the future is no farther than the next quarterly report and the past is not cost-effective to preserve. Indeed, time-binding may be legally irresponsible. Be very sure that companies are seeing that Bill Gates and Microsoft are having a difficult time in anti-trust proceedings because of old email messages which cast a very unflattering light on their actions. Magazines like *PC Week* are suggesting that companies should consider email policies that routinely purge messages. What will that do to institutional memory?

The signal-to-noise ratio is another problem. There is so much information

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available these days that there is almost a Darwinian competition for attention. How can what is significant be winnowed from all of the stuff that is being packaged and marketed to catch the mind's eye? How much attention can the nightly news give to the larger perspective of a story when much of it may be boring or difficult to follow, especially when those broadcasting the information know another channel is just a click away?

It's a cliché to proclaim that the Internet will serve as a means of preserving and propagating the kinds of information needed for meaningful time-binding. It can be, but aside from the problem of access to the necessary equipment, there are such problems as being aware something is out there on the net in the first place, actually finding it, and testing its validity.

Let's not forget one more phenomenon. In addition to ignorance and stupid arrogance, there is deliberate rewriting or obliteration of the past with malicious intent. Examples abound: the erasure of Tibetan culture and history by the Chinese; the dirty wars in Central and South America with legions of the "disappeared"; the efforts of the Ayatollahs of assorted religions and cults around the world; the guardians of political correctness carrying out agendas of their own; ethnic cleansing in the Balkans; and so on almost *ad infinitum*. The efforts of the South Africans to uncover and reconcile themselves to the real facts of their recent history is an unfortunate exception to the observation that "history is written by the winners."

At the risk of making a really horrific comparison, which is in no way intended to demean or trivialize those who suffer from it, time-unbinding is to societies, cultures, and nations what Alzheimers Disease is to individuals. The difference is that it can be combatted with some success, but only where there is awareness and appreciation of what has gone before.

LARRY ROTH

Stan:

I agree with the tenor of your editorial "Time-Unbinding": I hold no brief for "stupid arrogance." Nevertheless, I think that a small misreading of history leads you to a superficial analysis of the problem of preserving knowledge in the digital age.

You say that "our preliterate ancestors needed bards who could memorize long epics because nothing better was available." The something better, you say, was writing. Not so. The ancient bards were practitioners of oral traditions. The greater part of the information they were dealing with was in the form of acoustical phenomena (inflections, tones and rhythms), information not only not preservable by writing, but arguably destroyable by it. To suggest that writing is the best way to preserve an oral tradition is like suggesting that the best way to preserve an endangered species is to kill the animals, stuff them and put them in a museum.

The point is that an oral epic tradition is a thing that lives, grows, and evolves through an ephemeral acoustical medium. The very ephemerality of the medium is essential to the living: freeze the medium, kill the life.

In the '60s McLuhan argued that the electonic media would become a new, global medium for oral tradition. Time has proven him right. But the point still holds: the medium of an oral tradition is, of necessity, ephemeral. In this case, the medium consists of massive amounts of information entering and leaving the system, being transformed in the process. Most of that information should not be preserved—not only because it is not worth preserving, but, more importantly, because the attempt to preserve it will kill the system. The more important challenge, therefore, is not to increase memory and ensure compatability, but to devise information-processing techniques for distinguishing the ephemeral (which cannot be preserved without destroying its efficacy) from the perma-

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nent (which can and should be preserved for the reasons you mention). This is not just a problem of deciding what's important. It involves, rather, understanding better the dynamic, vital nature of the very information that has become the lifeblood of this new—and yet in some respects very old—world.

JON BARLOW
jbarlow@wesleyan.edu

Yes, an oral tradition has artistic values that are lost when somebody tries to capture them in writing—but the fact remains that, as a means of storing information, it has the limitations I described, and writing doesn't. And unfortunately, "distinguishing the ephemeral from the permanent" is very difficult to do when information is new. I've personally had many experiences with information that I saved only because I'm an informational packrat, without anticipating any actual future need for it, and then much later found very useful for purposes I could not have anticipated!

Dear *Analog*,

I enjoyed Stephen L. Gillett's Science Fact article "Digital Matter" (February 1999). However, there were some minor flaws in his presentation.

Dr. Gillett says "Quantum Mechanics is quintessentially a *mathematical*, theory" and describes it as "rigorous." Dr. Gillett writes from the perspective of a self-professed "hard headed engineer (HHE)," and from that perspective QM might appear to be mathematical. However, it does not appear to be mathematical from a mathematical perspective, and certainly not rigorous.

The two basic problems with Quantum Mechanics from the perspective of a mathematician are renormalization and measurement. Renormalization is an extraordinarily successful hack, but it remains a hack. Of course, the issue only exists for Quantum Field Theory, not for single-particle systems, but QFT in general and QED in particular are relevant to the systems that Dr. Gillett was discussing.

Measurement is a problem to the mathematician because in most interpretations it takes place outside of the equations: "collapse of the wave function" or similar hand waving. A mathematician would not view QM as rigorous unless the interpretation was one like the Many Worlds interpretation, in which measurement was covered by the same equations as any other process.

Dr. Gillett appears to imply that solutions to the Schrödinger Equation always have discrete energy levels. However, as I am sure he is aware, a discrete spectrum is characteristic of a confined (bound) system. If you solve the Schrödinger Equation for a system consisting of an H_2+ molecule and an unbound electron, you will discover that the light emitted upon recombination has a continuous spectrum. Only a few basic physical properties are quantized regardless of confinement; e.g., angular momentum, charge.

Dr. Gillett talks about the uncertainty principle as precluding the arbitrarily precise measurements of physical quantities, and states that there are cases where it does not apply. That was a rather startling error. In fact, the uncertainty principle relates to the measurements of pairs of complementary quantities (in which the operators do not commute), and always applies. Heisenberg originally formulated it in terms of position and momentum, but it covers far more than that. The precise measurement of the rest mass of an electron is a case where only a single quantity is measured, hence our ability to conduct the measurement.

Dr. Gillett alluded to the attempts to reconcile QM with General Relativity. I would have liked to see a brief mention of such approaches as Supersymmetry and String Theory, although I understand that size limitations may have made that impossible.

SHMUEL (SEYMOUR J.) METZ,
SYSPROG AND JOAT

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The author replies. . . .

Mr. Metz brings up some interesting points, but some appear to be semantic quibbling (e.g., about "rigorous"), and some are just misunderstandings.

(1) As I said, QM is the most successful physical theory ever, and a recipe/algorithm/theory/whatever that can describe, *quantitatively,* such a vast swath of physical phenomena to as many decimal places as we can measure is certainly "rigorous" for all practical purposes (FAPP)! (Bohr would have said that that's all we *can* ask.) Yes, there are ambiguities in the foundations of QM (which Bell has discussed at length, far more than I am competent to), but I'm not sure that even their "mathematical" rigor is the issue. See Bell's "Against Measurement" piece; also the essays in his *Speakable and Unspeakable in Quantum Mechanics*. Wick's book, which I cited, has more popular level expositions.

Indeed, whatever the lingering ambiguities about (e.g.) the boundary between system and observer, they're not a problem in application to real problems. I have wondered whether such problems may simply be semantic; obviously real quantum mechanics *know* what they're doing; maybe they're just not describing it well (cf. comment (6) below). Levy-Leblond suggests as much in the paper I cited.

(2) Renormalization lay well beyond the scope of the article!

(3) Again, the issues about "measurement" have been belabored in great detail in (e.g.) the references above. The point about decoherence is that it attempts to solve the "measurement" problem within the context of the unaltered Schrödinger equation; see Lindley's book that I cited, which also has entries to the technical literature.

I can't take the "Many Worlds solution" seriously, by the way, for reasons well laid out in both Lindley's and Wick's books.

(4) I said that solutions to the Schrödinger equation "typically" look like standing waves. I didn't say they "always" do. The obvious example is a free particle, for which the solution is a continuum.

(5) After stating that the uncertainty principle "always" applies, Mr. Metz goes on to point out (as I did) a place where it doesn't! Not all physical quantities occur in complementary pairs. Rest mass and charge are two outstanding examples. (Consider [say] the consequences if the rest mass of a photon were *not* identically zero at all times.)

If he talks with layfolk, he will find that they haven't a clue what "complementary" quantities are, but are vaguely under the impression that "everything" is subject to the uncertainty principle. That's what I was addressing.

I suspect that the key point about such things as particle masses and charges is that they are *identical*—indeed, defining—properties shared by all particles of that type. By contrast, obviously all electrons (say) do not have the same value of momentum, nor even the same state vector.

It has been realized, by the way, that the uncertainty principle has been bandied about much too broadly. See Dehmelt's work on measuring, directly, the magnetic moment of a *single* electron, which is well-described in Wick's book. This was traditionally purported to be forbidden by the uncertainty principle, and you can still find that assertion in textbooks.

(6) As for reconciliations of GR and QM, I'm not qualified to comment in any detail (that's John Cramer's department!). I suspect, however, that the problem lies not in "mathematical rigor" but in the articulation of a set of fundamental concepts (much as, say, "energy" and "momentum" have replaced vague notions about "impetus" and so on).

STEPHEN L. GILLETT

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Dear *Analog*,

I've been a loyal reader of *Analog* for twenty-eight-plus years and a long-time fan of Ben Bova. Thus my disappointment at his almost-unreadable "Mount Olympus" in the February 1999 *Analog*. The constant wimpy, whining, mewling characters was a real turnoff. I'm not saying characters have to be macho and without self-doubt, but "Mount Olympus" laid it on too thick. It made for a total disconnect between the plot situation and the weakness of the characters placed in it.

JAY LOUNSBURY

The author replies. . . .

Dear Stan:

I'm disappointed in Jay Lounsbury's reaction to the characters in "Mt. Olympus." I don't regard a character's expressing fear and doubts about a dangerous mission as being "wimpy, whining, mewling." In fact, Rodriguez and Fuchida conquer their fears and accomplish their mission in spite of them—just as explorers (and astronauts) have throughout history. Good fiction is based on realistic characters, not stereotypes.

BEN BOVA

Dear Dr. Schmidt:

Dr. Mia Molvray says, in her February 1999 letter, that irradiation spoils some of the vitamins. Name one form of food preservation that does *not!* As for the "alternative" of providing processes to deliver clean meat, the implication is that processors intentionally produce dirty food to increase profits. I have worked, in the past, for several food processors and can attest that *any* suggestion that food safety be hazarded to enhance profits would cost you your job. That minute percentage of (contaminated) foodstuffs that do make it past our extraordinarily sanitary system is the envy of the world. To go beyond the current methodology would so raise the cost of food that most of us would go hungry.

I would allow the opponents of irradiation their labels, even as they promote the ludicrous fiction that irradiation is an additive, and buy nothing that lacked that label.

WALTER E. WALLIS, P.E.

(Biolog continued from p. 224)

A nine-year-old daughter is getting a head start on becoming a next-century Renaissance Woman by taking up ballet lessons and story writing just as her mother had in grade school.

Stan Schmidt found Catherine in the slush pile with a first-sale novelette for the April 1994 issue. Now a full-time writer, she has several books in print: *Primary Inversion* (1995), *Catch the Lightning* (1996), *The Last Hawk* (1997), and *The Radiant Seas* (1998). Expected in 1999, *The World Web*. In 2000, *The Quantum Rose*. In 2001, *Spherical Harmonic*.

Catherine's first novel won two awards. *The Last Hawk* made the final Nebula ballot for Best Novel of 1998, along with her December 1998 *Analog* story for Best Novella.

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UPCOMING EVENTS Anthony Lewis

2–5 July 1999
EMPIRE CON/WESTERCON 52 (West Coast Regional SF conference) at Doubletree City Center, Spokane WA; Guests of Honor—C.J. Cherryh, Kristine Kathryn Rusch, Barbara Hambly; Editor Guest of Honor—Ellen Datlow; Artist Guests of Honor—Wendy Pini, Alicia Austin.; Fan Guest of Honor—Larry Baker; TM—Betty Bigelow. Registration—$55 until 1 June 1999, $60 at door; $20 supporting. Info—Empire Con, Box 7477, Spokane WA 99207; (509)482-5288; email—westercon52@webwitch.com; URL—http://www.webwitch.com/westercon52

9–11 July 1999
READERCON 11(Literary-oriented SF conference) at Westin Hotel, Waltham MA. Guests of Honor—Harlan Ellison and Ellen Datlow. Registration—$35 until 15 February 1999; more afterwards and at the door. Info—Readercon, Box 381246, Cambridge MA 02238-1246; email—zeno@mit.edu; URL—http://www.mit.edu/~zeno/readercon.html

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30 July–1 August 1999
RIVERCON XXIV (Louisville area SF conference) at Executive West Hotel, Louisville, KY. Guest of Honor—Esther Friesner; Artist Guest of Honor—Gary Williams; Fan Guests of Honor—Pat & Roger Sims; TM—Lawrence Watt-Evans. Registration—$25 until 15 July 1999, $35 thereafter. Info—RiverCon XXIV, Box 58009, Louisville KY 40268. email—RiverConSF@aol.com; URL—http://members.aol.com/raroehm/rivercon.html

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5–7 August 1999
DEEPSOUTHCON 37/CRESCENT CITY CON XIV (Southern SF conference) at Best Western Landmark, Metairie LA. Guest of Honor—Mike Resnick; Fan Guest of Honor—Toni Weisskopf; Special Guest—Barbara Hambly; TM—Geo. Alec Effinger. Registration—$40 until 4 July 1999, $50 at door. Info—DeepSouthCon/Crescent City Con, Box 52622, New Orleans LA 70150; (504) 488-0489; email—cccno@aol.com; URL—www.fatsnake.com/ccc

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20–22 August 1999
NECRONOMICON 4 (Horror-oriented conference) at Marriott Hotel, Providence RI. Guest of Honor—Fred Chappell; Special Guest—T.E.D. Klein. Info—NecronomiCon, Box 1320, Back Bay Annex, Boston MA 02117; email—necronomicon@necropress.com; URL—http://www.necropress.com/necronomicon/main.shtml

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26–29 August 1999
CONUCOPIA/NASFiC '99 (North American SF Conference) at Anaheim Marriott, Anaheim CA. Guest of Honor—Jerry Pournelle; Editor Guest of Honor—Ellen Datlow; Fan Guests of Honor—Dick & Nicki Lynch; Registration—$100; $20 supporting. Info: Conucopia/NASFiC '99, c/o S.C.I.F.I. Inc., Box 8442, Van Nuys CA 91409; email—info@99.nasfic.org; URL—www.99.nasfic.org

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2–6 September 1999
AUSSIECON THREE (57th World Science Fiction Convention) at World Congress Centre, Melbourne, Australia. Guests of Honour—George Turner (in memoriam), Gregory Benford, Bruce Gillespie. URL—http://www.aussiecon3.worldcon.org■

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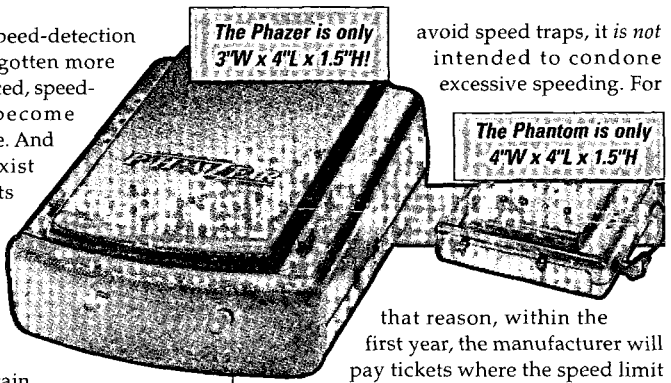
How to make your car invisible to radar and laser

Rocky Mountain Radar introduces a device guaranteed to make your car electronically "invisible" to speed traps—if you get a ticket while using the product, the manufacturer will pay your fine!



It seems that as speed-detection technology has gotten more and more advanced, speeding tickets have become virtually unavoidable. And although devices exist that enable motorists to detect these speed traps, they are outlawed in many states...including mine.

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Encourage responsible driving. While the Phazer *is* designed to help you (and me) avoid speed traps, it *is not* intended to condone excessive speeding. For that reason, within the first year, the manufacturer will pay tickets where the speed limit was not exceeded by more than 30%, or 15 miles per hour, whichever is less.

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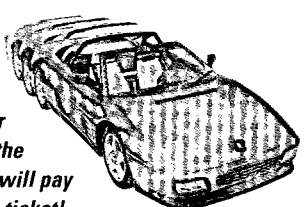

The Phazer makes your car invisible to police radar and lasers or the manufacturer will pay your speeding ticket!

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TECHNOLOGY UPDATE

Big sound from a stereo radio—without the big price!

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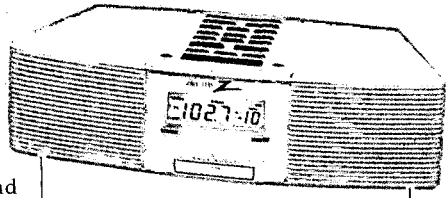

Zenith Audio has developed a Digital Stereo Clock Radio that boasts the acoustic quality and practical features of stereo radios four times as expensive. You'll be amazed at the sound quality and powerful bass you get from a radio this small and this affordable. This stereo radio features an 11-key handheld remote control and an input jack for CD players or other audio sources.

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- "Fail-safe" Alarm System

Loaded with features. The AM/FM radio features digital tuning for pinpoint reception and crystal-clear sound. The STEREO indicator allows you to tune in to the stereo signal. It also picks up TV and WEATHER signals with 13 TV channels and 7 Weather channels, so your Zenith Audio Clock Radio is a great source of news, entertainment and information. You can program the unit's memory for 37 preset stations, and the tuning buttons can operate either manually or in a automatic search mode.

Practical functions. The backlit clock has several alarm functions, so you can wake to either radio, TV, weather or a buzzer. The sleep timer allows you to fall asleep to up to 90 minutes of music, TV or weather and then shuts off automatically. In the morning, if you need a few extra minutes of sleep, press the SNOOZE bar on the control panel or on the remote. The radio or alarm tone stops for 10 minutes and then sounds again. The unit's battery backup system will maintain the time, alarm and preset station memories in the event of a temporary power interruption.

Factory direct risk-free offer. You can spend hundreds of dollars more on a stereo radio, but why do it? We get the Stereo Clock Radio direct from Zenith and pass the savings on to you. This product comes with a one-year manufacturer's limited warranty and Comtrad's exclusive risk-free home trial. If you are not satisfied for any reason, simply return it within 90 days for a full "No Questions Asked" refund.

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